



U.S. ENVIRONMENTAL PROTECTION AGENCY
 Office of Pesticide Programs
 Registration Division (7505P)
 1200 Pennsylvania Ave., N.W.
 Washington, D.C. 20460

EPA Reg. Number:

74530-91

Date of Issuance:

4/27/20

NOTICE OF PESTICIDE:

Registration
 Reregistration
 (under FIFRA, as amended)

Term of Issuance:

Conditional

Name of Pesticide Product:

Zone Defense

Name and Address of Registrant (include ZIP Code):

Bert Volger, Ph.D.
 Agent for Helm Agro US, Inc.
 c/o Ceres International, LLC
 1087 Heartsease Drive
 West Chester, PA 19382

Note: Changes in labeling differing in substance from that accepted in connection with this registration must be submitted to and accepted by the Registration Division prior to use of the label in commerce. In any correspondence on this product always refer to the above EPA registration number.

On the basis of information furnished by the registrant, the above named pesticide is hereby registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA).

Registration is in no way to be construed as an endorsement or recommendation of this product by the Agency. In order to protect health and the environment, the Administrator, on his motion, may at any time suspend or cancel the registration of a pesticide in accordance with the Act. The acceptance of any name in connection with the registration of a product under this Act is not to be construed as giving the registrant a right to exclusive use of the name or to its use if it has been covered by others.

This product is conditionally registered in accordance with FIFRA section 3(c)(7)(A). You must comply with the following conditions:

1. Submit and/or cite all data required for registration/reregistration/registration review of your product under FIFRA when the Agency requires all registrants of similar products to submit such data.

Continued on page 2

Signature of Approving Official:

Mindy Ondish, Product Manager 23
 Herbicide Branch, Registration Division (7505P)

Date:

4/27/20

2. You are required to comply with the data requirements described in the Generic Data Call-In (GDCI) identified below:
 - a. Flumioxazin GDCI-129034-1236

You must comply with all of the data requirements within the established deadlines. If you have questions about the GDCI listed above, you may contact the Chemical Review Manager in the Pesticide Reevaluation Division: <http://iaspub.epa.gov/apex/pesticides/f?p=chemicalsearch:1>

3. The data requirements for storage stability and corrosion characteristics (Guidelines 830.6317 and 830.6320) are not satisfied. A one-year study is required to satisfy these data requirements. You have 18 months from the date of registration to provide these data.
4. Submit one copy of the final printed label for the record before you release the product for shipment.

Should you wish to add/retain a reference to the company's website on your label, then please be aware that the website becomes labeling under FIFRA and is subject to review by the Agency. If the website is false or misleading, the product would be misbranded and unlawful to sell or distribute under FIFRA section 12(a)(1)(E). 40 CFR 156.10(a)(5) list examples of statements EPA may consider false or misleading. In addition, regardless of whether a website is referenced on your product's label, claims made on the website may not substantially differ from those claims approved through the registration process. Therefore, should the Agency find or if it is brought to our attention that a website contains false or misleading statements or claims substantially differing from the EPA approved registration, the website will be referred to the EPA's Office of Enforcement and Compliance.

If you fail to satisfy these data requirements, EPA will consider appropriate regulatory action including, among other things, cancellation under FIFRA section 6(e). Your release for shipment of the product constitutes acceptance of these conditions. A stamped copy of the label is enclosed for your records. Please also note that the record for this product currently contains the following CSFs:

- Basic CSF dated 04/27/2020
- Alternate CSF 1 & 2 dated 04/27/2020

If you have any questions, please contact Curtis Hildebrandt at 703-347-8198 or by email at hildebrandt.curtis@epa.gov.

Enclosure



ZONE DEFENSE
New Product Label, US EPA Review.20200427

SULFENTRAZONE	GROUP	14	HERBICIDE
FLUMIOXAZIN	GROUP	14	HERBICIDE

Zone Defense

FOR CONTROL AND/OR SUPPRESSION OF CERTAIN WEEDS IN ASPARAGUS; BRASSICA (HEAD AND STEM); DRY BEAN AND DRY PEA; FRUITING VEGETABLES; MINT; PEANUTS; SOYBEAN; STRAWBERRY; SUGARCANE; WHEAT (SPRING) AND PERMANENT CROPS - ALMONDS, APPLES, BUSHBERRY, CANEBERRY, CITRUS FRUIT, GRAPE AND NUT TREES (INCLUDING PISTACHIOS).

ALSO FOR USE IN DORMANT BERMUDAGRASS IN RESIDENTIAL TURF AND SOD FARMS AND FOR MAINTAINING BARE-GROUND IN NON-CROP AREAS

ACTIVE INGREDIENTS:	% BY WT.
Sulfentrazone	62.2%
Flumioxazin	15.0%
OTHER INGREDIENTS:	22.8%
TOTAL	100.0%

Contains 0.62 lb. sulfentrazone per lb. of product.

Contains 0.15 lb. flumioxazin per lb. of product.

EPA Reg. No. 74530-91

EPA Est. No xxx-xx-xxx

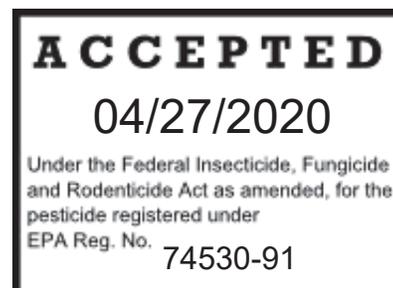
Net Contents:

**KEEP OUT OF REACH OF CHILDREN
CAUTION**

FIRST AID

If Swallowed	<ul style="list-style-type: none"> • Call a poison control center or doctor immediately for treatment advice. • Have person sip a glass of water if able to swallow. • DO NOT induce vomiting unless told to do so by the poison control center or doctor. • DO NOT give anything by mouth to an unconscious person.
If in Eyes	<ul style="list-style-type: none"> • Hold eye open and rinse slowly and gently with water for 15 to 20 minutes. • Remove contact lenses, if present, after the first 5 minutes, then continue rinsing eye. • Call a poison control center or doctor for treatment advice.
HOT LINE: Have the product container or label with you when calling a poison control center, such as 1-800-222-1222 or doctor or going for treatment. For Chemical Emergency Assistance (Spill, Leak, Fire or Accident) call CHEMTREC at 1-800-424-9300.	

Manufactured for: HELM AGRO US Inc.
401 E. Jackson St., Suite 1400
Tampa, FL 33602
info@helmagro.com



**PRECAUTIONARY STATEMENTS
HAZARDS TO HUMANS AND DOMESTIC ANIMALS**

CAUTION

Harmful if swallowed. Causes moderate eye irritation. Avoid contact with eyes or clothing. Wash thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco, or using the toilet.

PERSONAL PROTECTIVE EQUIPMENT (PPE)

Applicators and other handlers must wear:

- long-sleeved shirt and long pants
- chemical-resistant gloves made of barrier laminate, butyl rubber ≥14 mils, nitrile rubber ≥14 mils, neoprene rubber ≥14 mils, polyvinyl chloride ≥14 mils, or Viton ≥14 mils
- shoes and socks
- protective eyewear

For aerial application to sugarcane, mixer/loaders must also wear: coveralls, chemical resistant apron and chemical resistant boots.

For aerial application to artichoke; field peas; lentils; and wheat, mixer/loaders must also wear: filtering face piece respirator (N95, R95 or P95).

Follow manufacturer's instructions for cleaning and maintaining PPE. If no such instructions for washables exist, use detergent and hot water. Keep and wash PPE separately from other laundry.

Remove and wash contaminated clothing before reuse. If clothing and other absorbent materials have been drenched or heavily contaminated with this product DISCARD and **DO NOT** reuse them.

USER SAFETY RECOMMENDATIONS

Users should:

- Always wash hands thoroughly with soap and water after handling and before eating, drinking, chewing gum, using tobacco or using the toilet.
- Remove clothing/PPE immediately if pesticide gets inside. Then wash thoroughly and put on clean clothing.
- Remove PPE immediately after handling this product. Wash the outside of gloves before removing. As soon as possible, wash thoroughly and change into clean clothing.

ENVIRONMENTAL HAZARDS

This pesticide is toxic to non-target plants and marine/estuarine invertebrates and should be used strictly in accordance with the drift and run-off pre-cautions on this label in order to minimize off-site exposures. **DO NOT** apply directly to water, to areas where surface water is present or to intertidal areas below the mean high water mark. Drift and runoff may be hazardous to terrestrial and aquatic plants in neighboring areas. **DO NOT** apply where runoff is likely to occur. **DO NOT** apply when weather conditions favor drift from treated areas. **DO NOT** contaminate water when disposing of equipment washwaters or rinsate.

Surface Water Advisory: This product can contaminate surface water through spray drift. Under some conditions, this product may have a high potential for runoff into surface water (primarily via dissolution in runoff water) or adjacent land, for several too many months post-application. These include poorly draining or wet soils with readily visible slopes toward adjacent surface waters, frequently flooded areas, and areas overlying extremely shallow groundwater, areas with in-field canals or ditches that drain to surface water, areas not separated from adjacent surface waters with vegetated filter strips, and areas over-lying tile drainage systems that drain to surface waters.

Ground Water Advisory: This product is known to leach through soil into groundwater under certain conditions as a result of label use. Use of this product in areas where soils are permeable, particularly where the water table is shallow, may result in groundwater contamination. **DO NOT** use on coarse soils classified as sand which have less than 1% organic matter.

Under some conditions this product may have a potential to run-off to surface water or adjacent land. Where possible, use methods which reduce soil erosion, such as no till, limited till and contour plowing; these methods also reduce pesticide run-off. Use of vegetation filter strips along rivers, creeks, streams, wetlands or on the downhill side of fields where runoff could occur will minimize water run-off and is recommended.

PHYSICAL/CHEMICAL HAZARDS

DO NOT mix or allow coming in contact with oxidizing agents. Hazardous chemical reaction may occur.

DIRECTIONS FOR USE

It is a violation of Federal law to use this product in a manner inconsistent with its labeling.

READ ENTIRE LABEL. USE STRICTLY IN ACCORDANCE WITH PRECAUTIONARY STATEMENTS AND DIRECTIONS, AND WITH APPLICABLE STATE AND FEDERAL REGULATIONS.

DO NOT apply this product in a way that will contact workers or other persons, either directly or through drift. Only protected handlers may be in the area at the time of application. For any requirements specific to your State or Tribe, consult the agency responsible for pesticide regulations.

AGRICULTURAL USE REQUIREMENTS

Use this product only in accordance with its labeling and with the Worker Protection Standard 40 CFR Part 170. This Standard contains requirements for the protection of agricultural workers on farms, forests, nurseries, and greenhouses, and handlers of agricultural pesticides. It contains requirements for training, decontamination, notification, and emergency assistance. It also contains specific instructions and exceptions pertaining to the statements on this label about personal protective equipment (PPE) and restricted- entry interval. The requirements in this box only apply to uses of this product that are covered by the Worker Protection Standard.

DO NOT enter or allow worker entry into treated areas during the restricted entry interval (REI) of 12 hours. Exception: if the product is soil-injected or soil incorporated, the Worker Protection Standard, under certain circumstances, allows workers to enter the treated area if there will be no contact with anything that has been treated.

PPE required for early entry to treated areas that is permitted under the Worker Protection Standard and that involves contact with anything that has been treated, such as plants, soil, or water, is:

- coveralls over long-sleeved shirt and long pants
- chemical-resistant gloves made of barrier laminate, butyl rubber ≥14 mils, nitrile rubber ≥14 mils, neoprene rubber ≥14 mils, polyvinyl chloride ≥14 mils, or Viton ≥14 mils
- shoes plus socks.

STORAGE AND DISPOSAL

DO NOT contaminate water, food or feed by storage or disposal or cleaning of equipment.

Pesticide Storage

Store product in original container only. Keep container closed when not in use, away from food or feed, fertilizer and other pesticides. **DO NOT** put formulation or dilute spray solution in food or drink containers. Store in a cool dry place and avoid excess heat. **DO NOT** store below 30°F degrees.

Pesticide Disposal

Wastes resulting from the use of this product that cannot be used must be disposed of in a landfill approved for pesticide disposal or in accordance with applicable Federal, State or local procedures. For more information contact your State Pesticide or Environmental Control Agency or the Hazardous Waste representative of the nearest EPA Regional Office for guidance.

Container Handling

[If this product is shipped in container small enough to shake, the following container handling statement will be added to the label]

[Nonrefillable Container: Do not reuse or refill this container. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank and drain for 10 seconds after the flow begins to drip. Fill the container 1/4 full with water and recap. Shake for 10 seconds. Pour rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Drain for 10 seconds after the flow begins to drip. Repeat this procedure two more times. Then offer for recycling, if available or puncture and dispose of in a sanitary landfill or by incineration or by other procedures allowed by State and local authorities.]

[If this product is shipped in drums or totes greater than 50 lb, the following container handling statement will be added to the label]

[Nonrefillable container. Do not reuse or refill this container. Clean container promptly after emptying. Triple rinse as follows: Empty the remaining contents into application equipment or a mix tank. Fill the container 1/4 full with water. Replace and tighten closures. Tip container on its side and roll it back and forth, ensuring at least one complete revolution, for 30 seconds. Stand the container on its end and tip it back and forth several times. Empty the rinsate into application equipment or a mix tank or store rinsate for later use or disposal. Repeat this procedure two more times. Offer for recycling or reconditioning, or puncture and dispose of in a sanitary landfill, or incineration, or by other procedures allowed by state and local authorities.]

[If this product is shipped in bag containers greater than 50 lbs, the following container handling statement will be added to the label:]

[Nonrefillable bag: Do not reuse or refill this bag. Completely empty bag by shaking and tapping sides and bottom to loosen clinging particles. Empty residue into equipment. Do not reuse bag. Dispose of bag in a sanitary landfill or by incineration or by other procedures allowed by state and local authorities.]

[Container statement for refillable container]

[Refillable Container: Refilling Container: Refill this container with Zone Defense only. Do not reuse this container for any other purpose. Cleaning the container before final disposal is the responsibility of the person disposing of the container. Cleaning before refilling is the responsibility of the refiller. To clean the container before final disposal, empty the remaining contents from this container into application equipment or mix tank. Fill the container about 10 percent full with water. Agitate vigorously or recirculate water with the pump for 2 minutes. Pour or pump rinsate into application equipment or rinsate collection system. Repeat this rinsing procedure two more times. When empty, return to point of sale.]

PRODUCT INFORMATION

Zone Defense is a dispersible granule formulated to easily mix with water, to be sprayed for selected pre-emergent and pre-plant incorporated weed control in soybeans, [other labeled crops Asparagus; Brassica (head and stem); Dry Bean and Dry Pea; Fruiting Vegetables; Mint; Peanuts; Strawberry; Sugarcane; Sunflower and Safflower; Wheat (Spring) and Permanent Crops - Almonds, Apples, Bushberry, Caneberry, Citrus Fruit, Grape and Nut Trees (including Pistachios)] and in non-crop areas of farms. Control of many broadleaf weeds and partial control of annual grasses will be attained when applied according to label instructions.

Rainfall or sprinkler irrigation is required to activate Pre-emergence and Pre-plant incorporated applications of Zone Defense. The control and duration of effect depend on the following: Use rate, growing conditions at and following time of treatment, weed spectrum, soil pH, moisture and precipitation and organic matter.

Zone Defense provides residual control of susceptible weeds.

Zone Defense provides additional burndown activity when used as part of a burndown program.

Zone Defense can be applied as part of a fall burndown program for control of susceptible winter annuals.

Zone Defense can be used on farms for non-selective vegetation control to maintain bare ground non-crop areas that must be kept weed free.

ROTATIONAL CROP GUIDELINES FOR ALL Zone Defense APPLICATIONS

Prior to using Zone Defense, consideration should be given to crop rotation plans. Crops other than soybeans may be extremely sensitive to low concentrations of Zone Defense remaining in the soil the next planting season. Choice of rotation crop is restricted following application of Zone Defense. (See "ROTATIONAL CROP TABLE")

TABLE: ROTATIONAL CROP describes the minimum length in months from the time of Zone Defense application until Zone Defense treated soil can be replanted to the crops listed in the table. When a specified tank mix is used, consult the tank mix partner labels for re-cropping instructions and follow the directions that are most restrictive.

For Full Use Rates

Refer to **IMPORTANCE OF SOIL PH** Section for additional information.

TABLE: ROTATIONAL CROP

Crop	Interval in Months	
	Tilled	No-Till
Alfalfa	12	12
Asparagus	4	8
Barley	4	4
Berries	4	8
Brassica head and stem (Broccoli and Cabbage)	4	8
Brassica leafy greens	4	8
Canola	24	24
Cereal Grains (Buckwheat, Oats, Pearl Millet, Proso Millet, Teosinte, Wild Rice)	12	12
Citrus	4	8
Clover	4	8
Corn, Field*	10	10
Corn, Pop	18	18
Corn, Sweet	18	18
Cotton	18	18
Cowpea, succulent (TN only)	4	8
Dry Shelled Beans and Peas	3	3
Flax	3	3
Fruiting Vegetables (except cucurbits)	4	8
Grapes	4	8
Horseradish	4	8
Lentils	6	6
Lima, beans succulent	4	8
Melons	4	8
Mint	4	8
Peanuts	Anytime	Anytime
Potatoes	4	8
Rhubarb	4	8
Rice	10	10
Rye	4	4
Safflower	3	3
Sorghum	10	10

Soybeans	Anytime	Anytime
Strawberry	4	8
Succulent peas	4	8
Sugar Beets	36	36
Sugarcane	Anytime	Anytime
Sunflower subgroup 20B, except Safflower	30 days	30 days
Sweet Potatoes	12	12
Tobacco	30 days	30 days
Tomato (Transplanted Only)	4	8
Tree Nuts	4	8
Triticale	4	4
Turf	4	8
Turnips	4	8
Wheat	4	4
Wheat, spring (pacific NW states ID, OR WA only)	4	8
All Other Crops	12	12

Crops that have rotational intervals greater than 12 months after a Zone Defense application are the result of crop injury concerns. Crops with greater than 12-month rotation intervals should only be planted with a successful bioassay. For specifications on a successful bioassay please contact your HELM Agro representative, Agriculture Extension Agency or laboratory undertaking assay.

*Field corn includes corn grown for grain, silage, and seed corn.

WEEDS CONTROLLED OR SUPPRESSED

Zone Defense applied alone or in recommended tank mixtures will provide control of the following weeds when applied in accordance with the Application information and the specific crop use directions. Refer to the specific crop section for more detail.

TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.

Common Name	Scientific Name
Amaranth, livid	<i>Amaranthus lividus</i>
Amaranth, Palmer	<i>Amaranthus palmeri</i>
Amaranth, Powell	<i>Amaranthus Powell II</i>
Amaranth, spiny	<i>Amaranthus spinosus</i>
Amaranth, spleen	<i>Amaranthus dubius</i>
Anoda, spurred	<i>Anoda cristata</i>
Bedstraw, catchweed	<i>Galium aparine</i>
Carpetweed	<i>Mollugo verticillata</i>
Chickweed, common	<i>Stellaria media</i>
Copperleaf, hophornbeam	<i>Acalypha ostryeafolia</i>
Copperleaf, Virginia	<i>Acalypha virginica</i>
Crabgrass, large	<i>Digitaria sanguinalis</i>
Crabgrass, smooth	<i>Digitaria ischaemum</i>
Crabgrass, Southern	<i>Digitaria ciliaris</i>
Croton, tropic	<i>Croton glandulosus</i>
Crownbeard, golden	<i>Verbesina encelioides</i>
Cupgrass, wooly	<i>Erichloa villosa</i>

Cyperus, hedgehog	<i>Cyperus compressus</i>
Daisy, American	<i>Eclipta alba</i>
Devilsclaw	<i>Proboscidea louisiana</i>
Dock, curly	<i>Rumex crispus</i>
Eclipta	<i>Eclipta prostrata</i>
Filaree, redstem	<i>Erodium cicutarium</i>
Flixweed	<i>Descurainia sophia</i>
Galinsoga, hairy	<i>Galinsoga ciliata</i>
Goosegrass	<i>Eleusine indica</i>
Groundcherry, clammy (seedling)	<i>Physalis heterophylla</i>
Groundcherry, cutleaf	<i>Physalis angulata</i>
Jimsonweed	<i>Datura stramonium</i>
Kochia (ALS and Triazine Resistant)	<i>Kochia scoparia</i>
Ladysthumb	<i>Polygonum persicaria</i>
Lambsquarters, common	<i>Chenopodium album</i>
Lettuce, miners	<i>Montia perfoliata</i>
Mallow, common	<i>Malva neglecta wall r.</i>
Mayweed, Chamomile	<i>Anthemis cotula l</i>
Milkweed, honeyvine	<i>Ampelamus albidus</i>
Morningglory, entireleaf	<i>Ipomoea hederacea integruscula</i>
Morningglory, ivyleaf	<i>Ipomoea hederacea hederacea</i>
Morningglory, palmleaf	<i>Ipomoea wrightii</i>
Morningglory, purple	<i>Ipomoea turbinata</i>
Morningglory, red	<i>Ipomoea, coccinea L.</i>
Morningglory, scarlet	<i>Ipomoea coccinea</i>
Morningglory, smallflower	<i>Jacquemontia tamnifolia</i>
Morningglory, tall	<i>Ipomoea, purpurea</i>
Mustard, tumble	<i>Sisymbrium altissimum</i>
Nightshade, black	<i>Solanum nigrum</i>
Nightshade, Eastern black	<i>Solanum ptycanthum</i>
Nutsedge, purple	<i>Cyperus rotundus</i>
Nutsedge, yellow	<i>Cyperus esculentus</i>
Orchardgrass	<i>Dactylis glomerata</i>
Panicum, fall	<i>Panicum dichotomiflorum</i>
Pigweed, redroot	<i>Amaranthus retroflexus</i>
Pigweed, smooth	<i>Amaranthus hybridus</i>
Plantain, blackseed	<i>Plantago rugelii decne</i>
Plantain, narrow-leaved	<i>Plantago lanceolata</i>
Poorjoe	<i>Diodia teres</i>
Porophyllum	<i>Porophyllum rederale</i>
Poinsettia, wild	<i>Euphorbia heterophylla</i>
Purslane, common	<i>Portulaca oleracea</i>
Redmaids	<i>Calandrinia ciliata</i>
Redweed	<i>Melochia corchorifolia</i>
Sedge, annual	<i>Carex spp.</i>
Senna, coffee	<i>Cassia occidentalis</i>

Sheperdspurse	<i>Capsella bursa-pastoris</i>
Sida, prickly	<i>Sida spinosa</i>
Sida, Southern	<i>Sida acuta</i>
Smartweed, PA (seedling)	<i>Polygonum pennsylvanicum</i>
Smellmellon	<i>Cucumis melo</i>
Starbur, bristly	<i>Acanthospermum hispidum</i>
Stinkgrass	<i>Eragrostis cilianensis</i>
Toadflax, yellow	<i>Linaria vulgaris</i>
Tassleflower, red	<i>Emilio sonchifolia</i>
Thistle, Russian	<i>Salsola kali</i>
Waterhemp, common	<i>Amaranthus rudis</i>
Waterhemp, tall	<i>Amaranthus tuberculatos</i>
Waterprimrose, winged	<i>Ludwigia decurrens</i>
Witchgrass	<i>Panicum capillare</i>

ENVIRONMENTAL CONDITIONS AND BIOLOGICAL PERFORMANCE

Burndown Application

For best results, Zone Defense should be applied as part of a burndown program to actively growing weeds. Applying Zone Defense under conditions that **DO NOT** promote active weed growth will reduce herbicide effectiveness. **DO NOT** apply Zone Defense when weeds are under stress due to drought, excessive water, extremes in temperature, disease or low humidity. Weeds under stress tend to become less susceptible to herbicidal action. Zone Defense is most effective when applied under warm sunny conditions. Reduced residual weed control may occur when burndown applications are made to fields where heavy crop and/or weed residue exist.

Preemergence Application (Conventional Tillage) Important: Crop injury may occur from applications made to poorly drained soils and/or applications made under cool, wet conditions. Minimize risk of crop injury by using on well drained soils, planting at least 1.5 inches deep, with high quality seed. Completely cover seeds with soil prior to preemergence applications. Treated soil that is splashed onto newly emerged crops may result in temporary crop injury.

Moisture is necessary to activate Zone Defense in soil for residual weed control. Dry weather following applications of Zone Defense may reduce effectiveness. However, when adequate moisture is received after dry conditions, Zone Defense will control susceptible germinating weeds. Zone Defense may not control weeds that germinate after application but before an activating rainfall/ irrigation or weeds that germinate through cracks resulting from dry soil.

When adequate moisture is not received after a Zone Defense application, weed control may be improved by irrigation with ½ to 1 inch of water. If emerged weeds are controlled by cultivation, residual weed control will be reduced.

FOR HERBICIDE ACTIVATION RAINFALL REQUIREMENT

Best results are obtained if Zone Defense is followed by rainfall or irrigation before weeds germinate. Several small rainfalls of less than 1/4" each are not as beneficial as one large rainfall of 1/2-1". If moisture is not sufficient to activate the herbicide, a rotary hoeing or shallow cultivation should be made after emergence of the crop while weeds are small enough to be controlled by mechanical means.

BIOLOGICAL ACTIVITY

Zone Defense quickly inhibits growth of susceptible weeds. Susceptible weeds may germinate and emerge following an application of pre-plant incorporation or pre-emergence treatment, but leaves become yellow soon after emergence and growth ceases. Death of growing points and leaf tissue will occur in some species while others will remain green, stunted and non-competitive. Zone Defense will provide partial control of some annual

grasses applied correctly but an additional product(s) may be warranted to provide best grass control.

Seedling vigor may be impacted if poor growing conditions prevail. If poor growing conditions are present Zone Defense (like other soil applied herbicides) may injure soybeans [or other labels crops]. In the event injury symptoms appear they will disappear rapidly and will not result in reductions of yield. Poor growing conditions, such as cool temperatures, presence of disease pathogens, excessive moisture and soil compaction may cause this temporary injury to soybeans [or other labeled crops].

Rainfastness

Zone Defense is rainfast one hour after application. Applications should not be made if rain is expected within one hour of application or postemergence burndown efficacy may be reduced.

USE RESTRICTIONS

- **DO NOT** apply or drain or flush equipment on or near desirable trees or other plants, or on areas where their roots may extend, or in locations where the chemical may be washed or moved into contact with their roots. Injury or loss of desirable trees or vegetation may result.
- **DO NOT** allow spray drift to contact desirable plants.
- **DO NOT** allow to contact with fertilizers, insecticides, fungicides and seeds during storage.
- **DO NOT** contaminate any body of water.
- **DO NOT** apply this product when weather conditions favor spray drift from treated areas.
- **DO NOT** apply during low-level inversion conditions, including fog.
- **DO NOT** apply to frozen or snow covered soil.
- **DO NOT** apply to farm alleys or roads where traffic may result in treated dust settling onto crops or other desirable vegetation.
- **DO NOT** apply within 300 yards of non-dormant pears.
- **DO NOT** apply to powdery soils or soils that are susceptible to wind displacement unless irrigation can be applied immediately after application.
- **DO NOT use spray equipment used to apply Zone Defense to apply other materials to any crop foliage, unless the proper cleanout procedures are followed. See "SPRAYER CLEANUP" for more information.**
- **DO NOT** apply more than the labeled amount of Zone Defense per acre per twelve-month period as stated in this label.

SPRAYER CLEANOUT

Spray equipment, including mixing vessels and nurse tanks, must be cleaned each day following Zone Defense application. After Zone Defense is applied, the following steps must be used to clean the spray equipment:

- 1) Drain the spray tank completely, rinse the sprayer thoroughly, including the inside and outside of the tank and all in-line screens.
- 2) Fill the spray tank with clean water.
- 3) Then flush all hoses, booms, screens and nozzles.
- 4) Top the tank off then add 1 gal of 3% household ammonia (or equivalent) for every 100 gallons of water, circulate through sprayer for 5 minutes.
- 5) Flush all hoses, booms, screens and nozzles for a minimum of 15 minutes.
- 6) If diaphragms are being used on the spray boom, loosen diaphragms before flushing the spray system, allowing cleaning solution to spray through the open diaphragm.
- 7) If spray lines have any end caps, loosen them before flushing the system, allowing cleaning solution to spray through the loosened caps.
- 8) To enhance removal of Zone Defense from the spray system, add a tank cleaner containing sodium hydroxide (15 – 30%) plus surfactants in place of ammonia and allow the cleaning solution to remain in the pressurized spray system (spray tank, hoses and boom) overnight before flushing the system for a minimum of 15 minutes.
- 9) Drain tank completely.
- 10) Add enough clean water to the spray tank to allow all hoses, booms, screens and nozzles to be flushed for 2 minutes.
- 11) Remove all nozzles and screens and rinse them in clean water.

DO NOT use spray equipment used to apply Zone Defense to apply other materials to any crop foliage, unless the proper cleanout procedures are followed. All tanks, hoses, booms, screens and nozzles, should be thoroughly cleaned before it is used to apply postemergence pesticides. Should small quantities of Zone Defense remain in inadequately cleaned mixing, loading, and/or spray equipment, they may be released during subsequent applications potentially causing effects to certain crops and other vegetation. Failure to follow these procedures can lead to injury to desirable crops. Helm Agro accepts no liability for any effects due to inadequately cleaned equipment.

APPLICATION INSTRUCTIONS

Proper Handling Instructions: **DO NOT** mix or load this product within 50 feet of any well to include abandoned and drainage wells, streams and rivers, lakes and reservoirs. This 50 foot perimeter does not apply to capped or plugged wells. It does not apply to dikes that are properly constructed around mixing or loading areas.

Operations that involve mixing, loading, rinsing, or washing of this product into or from pesticide handling or application equipment or containers within 50 feet of any well are prohibited unless conducted on an impervious pad constructed to withstand the weight of the heaviest load that may be positioned on or moved across the pad. Any such pad used for this purpose must be constructed to be able to contain: Product spills – Equipment leaks – equipment rinsate or wash – container leaks – rain water that collects on the pad. This pad must be self-contained. Pads that are constructed with roofs must be able to provide a minimum containment capacity of 100%. Pads without roofs must have a capacity to contain a minimum of 110% capacity of the largest container or application equipment that may be on the pad. The above mentioned minimum containment capacities **DO NOT** apply to equipment/vehicles that are delivering pesticide shipments to the loading or mixing site. Always check with your state regulatory official since each state may have different or additional well set-backs and or containment operation guidelines.

This product must be used in a way to prevent any back siphoning into wells. It must be used in a manner to prevent spills, improper disposal of pesticide, rinsates and or spray mixtures into wells or any water source.

APPLICATION EQUIPMENT

Application equipment should be clean and in good repair. Nozzles should be uniformly spaced on boom and frequently checked for accuracy.

BROADCAST APPLICATION

Ground Application: Apply Zone Defense alone and in tankmixes, with ground equipment with a properly calibrated sprayer equipped with flat fan or flood nozzles (preemergence applications only) designed to deliver the desired spray pressure and spray volume. Adjust spray pressures to recommendations that are appropriate for the nozzle type being utilized. Do not apply as spray droplets smaller than medium to coarse. Select nozzles and application pressure that deliver medium to coarse or larger spray droplets as indicated in the nozzle manufacturer's recommendations and in accordance with American Society for Agricultural and Biological Engineers (ASABE) Standard S-572. Select coarse to very coarse droplet size when Zone Defense is used as a preemergent/preplant application. Select medium to very coarse droplet size when Zone Defense is used postemergence with a contact burndown herbicide.

Use nozzles that require screens no finer than 50 mesh. Use 10 to 40 gallons of water per acre for preemergence applications. Use 15 to 60 gallons of water per acre for burndown applications. Use 20 to 60 gallons per acre if dense vegetation or heavy crop residue is present.

Nozzle selection should meet manufacturer's gallonage and pressure recommendations for preemergence or postemergence herbicide application. **DO NOT** use flood jet nozzles.

Continuous agitation in the spray tank is required to keep the product in suspension. Avoid overlap and shut off spray booms while starting, turning, slowing or stopping, as injury to the crop may result.

Applicators may spray only when wind speed is between 3 and 10 mph.

Aerial Application:

When applying by air, observe all precautions listed under SPRAY DRIFT and restrictions listed under SPRAY DRIFT RESTRICTIONS.

Aerial application is allowed only when environmental conditions prohibit ground application.

Zone Defense may be applied by air using properly calibrated nozzle types and arrangements that will provide optimum coverage while producing minimal amounts of fine droplets. When this product is allowed to be applied by air, applicator must use a minimum finished spray volume of 5 gallons per acre. Apply sufficient spray volume to achieve adequate coverage. For burndown, apply in 7 to 10 gallons of finished spray water per acre. Application at less than 7 gallons per acre may provide inadequate control. When used for preemergence weed control, apply Zone Defense in 5 to 10 gallons of water per acre. Higher gallonage applications generally afford more consistent weed control. **DO NOT** exceed the nozzle manufacturer's recommended pressures. For many nozzle types, lower pressure produces larger droplets. When higher flow rates are needed, use higher flow rate nozzles instead of increasing pressure.

Nozzle Selection and Orientation: Formation of very small drops may be minimized by appropriate nozzle selection, by orienting nozzles away from the air stream as much as possible and by avoiding excessive spray pressure. Use nozzles that produce flat or hollow cone spray patterns. Use non-drip type nozzles, such as diaphragm type nozzles, to avoid unwanted discharge of spray solution. The nozzles must be directed toward the rear of the aircraft, at an angle between 0 and 15° downward. **DO NOT** place nozzles on the outer 25% of the wings or rotors.

Spray drift away from the site of application may cause damage to non-target vegetation. Minimize drift by applying the largest droplet size consistent with uniform coverage and satisfactory weed control. To obtain satisfactory application and avoid drift, the following directions must be observed:

DO NOT apply when wind speed favors drift beyond the area intended for treatment.

DO NOT apply during low-level inversion conditions (including fog), when winds are gusty or under other conditions that favor drift. **DO NOT** spray when wind velocity is less than 2 mph or more than 10 mph.

DO NOT apply this product by air within 40 feet of non-target plants including non-target crops.

DO NOT apply this product by air within 100 feet of emerged cotton crop.

DO NOT apply this product by air within 40 feet of streams, wetlands, marshes, ponds, lakes and reservoirs.

When this product is allowed to be applied by air, applicator must use a minimum finished spray volume of 5 gallons per acre.

The maximum release height must be 10 feet from the top of the crop canopy, unless a greater application height is required for pilot safety.

Adjuvants and Drift Control Additives: Refer to tank mix partner's label for adjuvant recommendation. Drift control additives may be used. When a drift control additive is used, read and carefully observe the cautionary statements and all other information appearing on the adjuvant or drift control additive.

ADDITIVES**Burndown Application (Prior to Crop Emergence)**

Postemergence control of weeds from Zone Defense tank mixes will require the addition of an agronomically approved adjuvant to the spray mixture. When an adjuvant is to be used with Zone Defense, Helm Agro recommends the use of a Chemical Producers and Distributors Association certified adjuvant. Use either a crop oil concentrate (COC) or methylated seed oil (MSO) which contains at least 15% emulsifiers and 80% oil or a non-ionic surfactant (NIS) at 0.25% v/v, may be used when applying Zone Defense as part of a burndown program. Some tank mix partners, such as Roundup Power Max®, are formulated with sufficient adjuvants and **DO NOT** require the addition of a COC, MSO or NIS when tank mixed with Zone Defense. The addition of a COC or MSO may increase the burndown activity on certain weeds such as cutleaf eveningprimrose and Carolina geranium. Mixing compatibility qualities should be verified by a jar test.

A spray grade nitrogen source (either ammonium sulfate at 2 to 2.5 pounds per acre or a 28 to 32% nitrogen solution at 1 to 2 quarts per acre) may be added to the spray mixture along with either a COC, MSO or NIS to enhance weed control. The addition of a nitrogen source does not replace the need for a COC, a MSO or a NIS.

JAR TEST TO DETERMINE COMPATIBILITY OF ADJUVANTS AND Zone Defense

When using Zone Defense and an adjuvant in burndown situations, a jar test should be performed before mixing commercial quantities of Zone Defense with the adjuvant if using Zone Defense for the first time, with a new adjuvant or a new water source. Use the following procedure:

1. Add 1 pint of the water to a quart jar. Make sure the water is from the same source and temperature as will be used in the spray tank mixing operation.
2. Add 1 gram of Zone Defense to the quart jar for every 3 ounces of Zone Defense per acre being applied (4 grams if 12 ounces per acre is the desired Zone Defense rate), gently mix until product goes into suspension.
3. Add 60 milliliters (4 tablespoons or 2 fluid ounces) of the COC or MSO to the quart jar or 1 milliliter of NIS if it is being used in place of oil, gently mix.
4. If nitrogen is being used, add 16 milliliters (1 tablespoon or 0.5 fluid ounces) of the 28 to 32% nitrogen source to the quart jar. If ammonium sulfate is being used, add 19 g AMS to the quart jar in place of the 28 to 32% nitrogen.
5. Place cap on jar, invert 10 times, let stand for 15 minutes, evaluate.
6. An ideal tank mix combination will be uniform and free of suspended particles. If any of the following conditions are observed the choice of adjuvant should be questioned:
 - a) Layer of oil or globules on the mixture's surface.
 - b) Flocculation: fine particles in suspension or as a layer on the bottom of the jar.
 - c) Clabbering: thickening texture (coagulated) like cottage cheese or gelatin.

SPRAY DRIFT

SPRAY DRIFT RESTRICTIONS

Ground Applications

- Select nozzles and application pressure that deliver medium to coarse or larger spray droplets as indicated in the nozzle manufacturer's recommendations and in accordance with American Society for Agricultural and Biological Engineers (ASABE) Standard S-572.
- Select coarse to very coarse droplet size when sulfentrazone is used as a preemergent/preplant application.
- Select medium to very coarse droplet size when Zone Defense is used postemergence with a contact burndown herbicide.
- Applicators may spray only when wind speed is between 3 and 10 mph.
- Do not apply as spray droplets smaller than medium to coarse, defined by the ASABE standard.
- Ground applicators must use a minimum finished spray volume of 10 gallons per acre.
- When Zone Defense is tank mixed with a contact burndown herbicide, ground applicators must use a minimum spray volume of 15 gallons per acre.
- For boom spraying, the minimum release height must be 30 inches from the soil.

Aerial Applications

- Aerial application is allowed only when environmental conditions prohibit ground application.
- For aerial applications, the maximum release height must be 10 feet from the top of the crop canopy, unless a greater application height is required for pilot safety.
- When this product is allowed to be applied by air, applicator must use a minimum finished spray volume of 5 gallons per acre.

SPRAY DRIFT MANAGEMENT

AVOIDING SPRAY DRIFT IS THE RESPONSIBILITY OF THE APPLICATOR. Factors relating to the potential for spray drift are many. The most common is the interaction of many equipment and weather-related factors that can determine potential spray drift. Ultimately it is the applicator who is responsible for taking all these factors into consideration when making decisions on applications. Where states have more stringent regulations, they should be observed.

Importance of Droplet Size

APPLYING LARGER DROPLETS REDUCES SPRAY DRIFT POTENTIAL, BUT IT WILL NOT PREVENT DRIFT IF APPLICATIONS ARE MADE IMPROPERLY OR MADE UNDER UNFAVORABLE ENVIRONMENTAL CONDITIONS. Applications with the largest possible droplet sizes is the most effective way to reduce the potential for spray drift. This is the best strategy to manage the potential for spray drift and is based upon larger droplets to provide better coverage and control. Factors that also can affect an applicator's decision on balancing drift control and coverage are: the presence of non-targeted crops nearby – environmental conditions – and pest pressures.

Controlling Droplet Size- General Techniques

Volume - Nozzles with higher rated flows produce larger droplets.

Pressure - WHEN HIGHER FLOW RATES ARE NEEDED, USE A HIGHER-CAPACITY NOZZLE INSTEAD OF INCREASING PRESSURE. Use the lower spray pressures recommended for the nozzle. Higher pressure reduces droplet size and does not improve canopy penetration and deposition.

Nozzle Type - With most nozzle types, narrower spray angles produce larger droplets. Consider using low-drift nozzles. Use a nozzle type that is designed for the intended application.

Boom Height

Setting the boom at the lowest labeled height (if specified) which provides uniform coverage reduces the exposure of droplets to evaporation and wind. For ground equipment, the boom should remain level with the crop and have minimal bounce. For aerial applications, the maximum release height must be 10 feet from the top of the crop canopy, unless a greater application height is required for pilot safety

EFFECTS ON DRIFT POTENTIAL BY – WIND – TEMPERATURE AND HUMIDITY TEMPERATURE INVERSIONS

Wind

Applicators may spray only when wind speed is between 3 and 10 mph. Drift potential increases at wind speeds of more than 10 mph or less than 3 mph (due to inversion potential). However, many factors, including droplet size and equipment type determine drift potential at any given wind speed. AVOID GUSTY OR WINDLESS CONDITIONS.

Temperature Inversions

Temperature inversions restrict vertical air mixing, which causes small suspended droplets to remain close to the ground and move laterally in a concentrated cloud. Drift potential is high during a temperature inversion. Temperature inversions are common on nights with limited cloud cover and light to no wind and are characterized by increasing temperature with altitude. They begin to form as the sun sets and often continue into the morning. Their presence can be indicated by ground fog; however, if fog is not present, inversions can also be identified by the movement of smoke from a ground source or an aircraft smoke generator. Smoke that layers and moves laterally in a concentrated cloud (under low wind conditions) indicates an inversion, while smoke that moves upward and rapidly dissipates indicates good vertical air mixing.

Temperature and Humidity

When making applications in hot and dry conditions, set up equipment to produce larger droplets to reduce effects of evaporation.

WEED RESISTANCE MANAGEMENT

Sulfentrazone and flumioxazin, the active ingredients in this product, are both Group 14 herbicides, based on the mechanism of action classification system of the Weed Science Society of America. Any weed population can contain plants naturally resistant to Group 14 herbicides. Weed species resistant to Group 14 herbicides may be effectively managed utilizing another herbicide from a different Group, (either alone or in a mixture according to label directions), by using other cultural or mechanical methods of weed control, or by a combination of the two.

Consult your local company representative, state cooperative extension agent, professional consultant or other qualified authority to determine appropriate actions for controlling specific resistant weeds.

Weed Management Practices

Resistant populations arise when rare individual plants are uncontrolled by a normal dose of a given herbicide under normal environmental conditions. In the absence of other control measures these individuals survive, produce seed, and eventually become the dominant biotype in the field through continuous selection. The best means of reducing this selection is to use diverse weed control practices such as multiple herbicides with different mechanisms of action for the target weed, and often in combination with various mechanical and cultural practices.

To minimize the occurrence of herbicide-resistant biotypes, including those resistant to Group 14 herbicides, implement the following weed management practice options that are practical to your situation. These management practices are applicable to reduce the spread of confirmed resistant biotypes (managing existing resistant biotypes) and to reduce the potential for selecting for resistance in new species (proactive resistance management).

- Use a diversified approach toward weed management focused on preventing weed seed production and reducing the number of weed seeds in the soil.
- Plant crops into fields that are as weed-free as possible and then keep them as weed-free as possible.
- Plant crop seed that is as weed-free as possible.
- Scout fields routinely, before and after herbicide application.
- Use multiple herbicide mechanisms of action that are effective against the most troublesome weeds in your field and against those with known resistance.
- Apply herbicides at application rates listed on the label when weeds are within the size range indicated on the label.
- Emphasize cultural practices that suppress weeds by using crop competitiveness.
- Use mechanical and biological weed management practices where appropriate.
- Prevent field-to-field and within-field movement of weed seed or vegetative propagules.
- Manage weed seed at harvest and after harvest to prevent a buildup of the weed seedbank.

Management of Herbicide-Resistant Biotypes

Appropriate testing is needed to determine if a weed is resistant Group 14 herbicides. Contact your Helm Agro representative or your local State Cooperative Extension Agency to determine if resistance in any particular weed biotype has been confirmed in your area or visit on the Internet <www.weedresistancemanagement.com> or www.weedscience.org.

Specifically, glyphosate resistant weeds can be controlled or managed by applying this product in combination with herbicides labeled for control of the targeted weed in the crops specified on this label. For more information, see **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

Since the occurrence of resistant weeds is difficult to detect prior to use, Helm Agro accepts no liability for any losses that result from the failure of Zone Defense to control resistant weeds.

Report any incidence of repeated non-performance of this product on a particular weed to your Helm Agro representative, local retailer, or county extension agent.

SOIL CHARACTERISTICS

Application of Zone Defense to soils with high organic matter and/or high clay content may require higher dosages than soils with low organic matter and/or low clay content. Application to cloddy seedbeds can result in reduced weed control.

TABLE: SOIL CLASSIFICATION CHART

COARSE	MEDIUM	FINE
Sand	Sandy clay loam	Silty clay loam
Loamy sand	Sandy clay	Silty clay
Sandy loam	Loam	Clay loam
	Silt loam	Clay
	Silt	

IMPORTANCE OF SOIL PH

Always determine soil pH by laboratory analysis using a 1:1 ratio of soil to water suspension.

Variations of soil pH in the same field can vary as much as 2 pH units is not uncommon. Therefore, it is recommended that subsampling for pH values that may be higher than a field average. **DO NOT** depend on composite soil samples taken for analysis of soil fertility since they may not detect areas of high pH.

The following is a non-inclusive list of potential high pH areas where sub-sampling is recommended:

- Where different soil types are evident within a field, sample soil types separately.
- Where conditions vary within a field, sample areas separately, such as:
 - areas bordered by limestone gravel roads,
 - river bottoms subject to flooding,
 - low areas in hardpan soils where evaporative ponds may occur,
 - eroded hillsides,
 - along drain tile lines, and
 - areas where drainage ditch spoil has been spread.
- Where lime has not been deeply incorporated, soil may exhibit significantly higher pH values in the upper 3 inches of soil. Composite soil samples taken at a 6 to 8 inch depth may not reflect the elevated pH near the surface. In these cases shallow sampling, the upper 3 inches, is advised.

Follow all label restrictions regarding soil type, soil pH, organic matter, rotational crop intervals, geographic location, and weed pressure, in selecting the rate of Zone Defense.

TANK MIXES

NOTICE: Tank mixing or use of this product with any other product which is not specifically and expressly authorized by the label shall be the exclusive risk of user, applicator and/or application advisor, to the extent allowed by applicable law.

It is the pesticide user's responsibility to ensure that all products are registered for the intended use. Read and follow the applicable restrictions and directions for use on all product labels involved in tank mixing. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

Zone Defense, when applied according to label use directions, will control the weeds claimed in crop specific use directions. This label makes no claims concerning control of other weed species.

MAXIMUM ALLOWABLE SULFENTRAZONE AND FLUMIOXAZIN USE PER ACRE PER TWELVE MONTHS

Crop	Sulfentrazone Lbs AI / A	Flumioxazin Lbs AI / A
Row Crops		
Corn	0.375	0.096
Fallow	0.25	0.128
Peanuts	0.30	0.096
Potatoes	0.25	0.048
Soybeans	0.375	0.096
Sugarcane	0.375	0.383
Sunflower (Subgroup 20B)	0.25	0.096
Wheat (Spring) Pacific North West Only	0.1875	0.064
Vegetable Crops		
Asparagus	0.375	0.191
Brassica (Head and Stem) – Broccoli and Cabbage	0.375	0.191
Cowpea succulent (Tennessee Only)	0.1875	0.064
Dry Bean & Peas	0.25	0.064
Fruiting Vegetables and Okra (except Cucurbits)	0.375	0.255
Lima Beans succulent (Tennessee Only)	0.1875	0.064
Melons	0.25	0.255
Strawberry	0.375	0.096
Succulent Peas	0.1875	0.064
Oil Crops		
Mint	0.375	0.255
Permanent Crops		
Berries (Crop Group 13-07)	0.375	0.383
Citrus (Crop Group 10)	0.375	0.765
Grapes	0.375	0.765
Tree Nuts (Crop Group 14)	0.375	0.765

**ZONE DEFENSE RATE CONVERSION
ZONE DEFENSE RATES TO SULFENTRAZONE AND FLUMIOXAZIN LBS AI**

Rate Zone Defense Ounces	Sulfentrazone Lbs AI / A	Flumioxazin Lbs AI / A
9.6	0.375	0.090
8.1	0.314	0.076
7.8	0.304	0.073
7.2	0.281	0.068
6.6	0.255	0.062
6.5	0.253	0.061
6.4	0.248	0.060
5.2	0.201	0.049
4.8	0.187	0.045
3.9	0.150	0.037
3.6	0.140	0.034
3.3	0.128	0.031
3.25	0.126	0.030
2.4	0.094	0.023
1.8	0.070	0.017

DIRECTIONS FOR USE IN FALL AND SPRING PREPLANT BURNDOWN AND FALLOW SEEDBED PROGRAMS IN SOYBEAN AND PEANUT – PREEMERGENCE TO CROP
[For Use in the States of Arizona, California and Hawaii Only]

RESTRICTIONS

- **DO NOT** apply to frozen or snow covered soil.
- **DO NOT** perform any tillage operation after application or residual weed control will be reduced.
- Observe all rotational intervals prior to planting as listed in the **TABLE: ROTATIONAL CROP**.
- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.09 lb flumioxazin) of Zone Defense per acre per application.
- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.09 lb flumioxazin) of Zone Defense per acre per twelve-month period.
- **DO NOT** make more than 2 applications of Zone Defense per acre per year and do not exceed the maximum amount of Zone Defense per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense treatment.
- **DO NOT** use on soils classified as sand which have less than 1% organic matter.
- **DO NOT** apply after crop seed germination.

TIMING TO WEEDS

Burndown – Postemergence to Weeds

Zone Defense, applied as part of a burndown program, may be used for residual weed control, as well as to assist in postemergence burndown of many annual and perennial weeds where soybeans will be planted directly into a stale seedbed, cover crop or in previous crop residues. For control of emerged weeds, choose the most appropriate tank mix partner from **TABLE: BURNDOWN TANK MIXES**. Apply Zone Defense with ground equipment before planting, during planting or within 3 days after planting, **but before the crop emerges**. To ensure thorough coverage, use a minimum of 10 gallons of spray solution per acre. Refer to tank mix partner's label for recommended application pressure. All Zone Defense tank mixes applied to assist in the control of emerged weeds must be applied with crop oil concentrate or methylated seed oil at 1 to 2 pints per acre or a non-ionic surfactant at 0.25% v/v.

FALL BURNDOWN AND FALLOW SEEDBED PROGRAMS

Apply Zone Defense at 5.0 to 6.6 ounces per acre as a fall treatment to the stubble of harvested crops for the burndown of existing vegetation and pre-emergence control of labeled weeds the following spring in no-till and conservation tillage production systems where peanut or soybean will be planted. If weeds have emerged at the time of application, use Zone Defense in combination with a labeled burndown herbicide such as glyphosate, or glufosinate at labeled rates. Zone Defense can be used in a fall burndown or fallow seedbed program, however the length of residual control may be variable.

Fall applied burndown treatments should be made with a minimum of 10 gallons per acre to achieve adequate coverage of the weeds being treated. Applications volume should be increased to 15-20 gallons per acre or more where weed density is high or heavy crop residue levels are present. When making burndown applications to emerged weeds, the addition of adjuvants such as COC, NIS, or MSO to the spray mixture can be used to enhance the burndown activity of the application. Use higher rates for longer spring residual.

Use Crop Oil Concentrate (COC) or Methylated Seed Oil (MSO) at 1 gallon per 100 gallons of spray solution (1% v/v), or Non-ionic surfactant (NIS) at 1 qt./100 gallon of spray solution.

In addition to the specific adjuvants above, other adjuvants may be used if they provide the same or similar functions as those previously mentioned. The addition of other adjuvants or fertilizers such as ammonium sulfate (AMS) may aid in control of weeds when used with appropriate companion herbicides. Consult specific companion herbicides for additional adjuvant, and fertilizer recommendations when applying for burndown of existing vegetation.

INCREASING SPEED OF GLYPHOSATE BURNDOWN ACTIVITY: Zone Defense, at 3.3 ounces per acre may be tank mixed with glyphosate to increase the speed of burndown activity compared to glyphosate applied alone. Residual weed control will not be provided at rates lower than 5 ounces per acre; however, suppression of the weeds may occur at Zone Defense rates as low as 3.33 ounces per acre. Observe all rotational intervals prior to planting as listed in the **TABLE: ROTATIONAL CROP**.

For ground applications, use flat fan nozzles or other appropriate nozzle types and a 15 – 60 gallons of water per acre. Where dense vegetation or heavy crop residues are present, increasing the spray volume to 20 - 60 gallons per acre may improve spray coverage and weed control.

When an adjuvant is to be used with Zone Defense, Helm Agro recommends the use of a Chemical Producers and Distributors Association certified adjuvant.

To select the proper tank mix product, identify the weeds which need to be controlled and consult the product labels to determine which product is needed. Consult the companion tank mix herbicide label for use instructions, rates, precautions, restrictions, and other use information.

For instructions on how to prevent spray drift see section on **SPRAY DRIFT**.

Abnormally warm or wet winters will reduce the length of weed control observed in the spring.

Zone Defense may be used as part of burndown program to provide control or suppression of the following broadleaf weeds. For complete control of emerged weeds follow specific directions under the list of weeds below:

Chickweed ¹	Nightshade species
Dandelion	Pennycress
Garlic, wild	Pigweeds
Henbit	Ragweed, common
Lambsquarters	Ragweed, giant
Lettuce, prickly	Shepherd's-purse
Marestail	Smartweeds, annual
Mustard, tansy	Sunflower
Mustard, wild	Waterhemp species

¹For chickweed control add glyphosate or Express or Dicamba.

For Burndown control, pick the specified and appropriate rate from **TABLE: SOYBEAN RATE** and apply with:

- For complete burndown of emerged annual grasses or broadleaf weeds or for burndown of weeds not listed above, Zone Defense must be tank mixed with: glyphosate, glufosinate, paraquat, 2,4-D or other appropriate burndown herbicides.
- Crop Oil Concentrate (COC) or Methylated Seed Oil (MSO) at 1% v/v 1 gallon per 100 gallons of spray solution, or Non-ionic surfactant (NIS) at 1 qt./100 gallon of spray solution.
- In addition to the specific adjuvants above, other adjuvants may be used if they provide the same or similar functions as those previously mentioned. The addition of other adjuvants or fertilizers such as ammonium sulfate (AMS) may aid in control of weeds when used with appropriate companion herbicides. Consult specific companion herbicides for additional adjuvant, and fertilizer recommendations when applying for burndown of existing vegetation.
- Use flat fan nozzles or other appropriate nozzle types and a minimum of 10 gallons of water per acre. Where dense vegetation or heavy crop residues are present, increasing the spray volume to 15-20 gallons per acre or more may improve spray coverage and weed control.

To select the proper tank mix product, identify the weeds which need to be controlled and consult the product labels to determine which product is needed. Consult the companion tank mix herbicide label for use instructions, rates, precautions, restrictions, and other use information.

BURNDOWN TANK MIXES

Zone Defense may be tank mixed with the herbicides listed in **TABLE: BURNDOWN TANK MIXES** for increased burndown activity, additional residual broadleaf and/or additional grass control. Refer to tank mix partner’s label for adjuvant recommendations.

TABLE: BURNDOWN TANK MIXES

TANK MIX PARTNER	TARGET WEEDS*
2,4-D LVE	Marestail Giant Ragweed Dandelion
paraquat	Annual Grasses Henbit
glyphosate	General Burndown
quizalofop	Annual Grasses
imazaquin	Cocklebur, Common Sunflower
dicamba and 2,4-D dimethylamine	Marestail Giant Ragweed Dandelion

*Refer to tank mix product labels for specific recommendations for control of emerged weeds present.

ADDITIONAL RESIDUAL BROADLEAF CONTROL

Zone Defense can be tank mixed with metribuzin, chloransulam-methyl, linuron, imazethapyr, flumetsulam, pendimethalin or imazaquin for additional broadleaf control.

ADDITIONAL RESIDUAL GRASS CONTROL

Zone Defense can be tank mixed with pendimethalin or clomozone for additional grass control. In the states of Alabama, Arkansas, Delaware, Georgia, Louisiana, Maryland, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia, Zone Defense can be tank mixed with microencapsulated acetochlor at 2 ounces per acre. Tank mixes with flufenacet or dimethenamid may result in severe injury to soybeans [or other labeled crops] when application is followed by prolonged periods of cool wet weather and should not be used with Zone Defense. Zone Defense at 5.0 ounces per acre or less may be tankmixed with metolachlor products.

GLYPHOSATE TOLERANT PROGRAM

Zone Defense may be applied as part of a burndown program or preemergence in conventional tillage programs, at 5.0 – 6.6 ounces per acre to reduce early season weed competition from waterhemp, velvetleaf, nightshade and morningglories as well as other weeds listed in **TABLE: WEEDS CONTROLLED – FALL AND SPRING PREPLANT BURNDOWN PROGRAMS** in Roundup Ready programs. A sequential post emergence application of glyphosate will be required to control weeds not controlled by Zone Defense.

TABLE: WEEDS CONTROLLED – FALL AND SPRING PREPLANT BURNDOWN PROGRAMS

When used as directed Zone Defense will provide control of the following weed species:

Weeds 3 inches or less	
Chamomile, False	Cheatgrass
Chickweed, Common	Chickweed, Mouseear
Cockle, White	Dandelion
Deadnettle, Purple	Groundsel, Crossleaf
Henbit	Kochia
Marestail/Horseweed	Mallow, Common
Prickly Lettuce	Wormwood, Biennial
Canola, Volunteer	Carolina Geranium
Eveningprimrose, Cutleaf	Flixweed
Weeds 4 inches or less	
Mustard, Tansy	Mustard, Wild
Shepherd’s Purse	

SPRING BURNDOWN PROGRAMS

Zone Defense may be used in combination with labeled preplant burndown herbicides to assist in the postemergence burndown of emerged weeds and provide residual weed control prior to crop emergence. Weeds controlled or partially controlled by preemergence/residual activity are listed in **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION**.

No-till planters that incorporate the soil during planting may result in decreased weed control in the row. Apply Zone Defense after planting soybeans when these types of planters are used (within 3 days after planting soybeans before the crop emerges).

Zone Defense can be used at 3.3 to 6.6 ounces per acre with labeled preplant burndown herbicides to enhance the speed of burndown and increase weed spectrum. See **DIRECTIONS FOR USE IN SOYBEAN** for more information.

DIRECTIONS FOR USE IN ESTABLISHED ASPARAGUS

RESTRICTIONS

- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.090 lb flumioxazin) of Zone Defense per acre per application.
- **DO NOT** make more than 1 application of Zone Defense per acre per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense treatment.
- Apply only to dormant asparagus no less than 14 days before spears emerge. Application to non-dormant asparagus may result in unacceptable crop injury.
- **DO NOT** apply within 14 days to harvest.
- **DO NOT** use on soils classified as sand which have less than 1% organic matter
- **DO NOT** work soil within 60 days prior to application in the spring. Soil can be worked after spear harvest in preparation for Zone Defense application prior to fern emergence. Treated soil that is splashed onto the ferns may result in spotting.

PRECAUTIONS

- Apply Zone Defense as a broadcast treatment to crowns established for one or more years.
- When using a broadcast application apply in 10 to 40 gallons of finished spray per acre.

TABLE: ASPARAGUS RATE

Zone Defense Use Rate Table (Asparagus) Spring Preemergence Applications			
Broadcast Rate	Dry Ounces Zone Defense per Acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
< 1.5	3.6 – 4.8	4.8 – 6.4	6.4
1.5 - 3.0	4.8 – 6.4	6.4 – 8.1	8.1
> 3.0	6.4 – 8.1	8.1 – 9.6	9.6

Refer to the use rate information on **TABLE: SOIL CLASSIFICATION CHART** for soil categories.
Use the higher rates for soils of pH less than 7.0 and lower rates for pH greater than 7.0 within the specified rate range.

TABLE: WEEDS CONTROLLED - ASPARAGUS

When applied according to directions for use Zone Defense will provide control of the following weeds.

Amaranth, Palmer	Lambsquarter, common	Nightshade, Eastern black	Pigweed, redroot
Galinsoga, hairy	Morningglory, ivyleaf	Nutsedge, yellow	Pigweed, smooth

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION**.

TIMING TO ASPARAGUS - Dormant

Zone Defense may be applied to dormant asparagus for preemergence control of the weeds listed in WEEDS CONTROLLED - ASPARAGUS. Application to non-dormant asparagus will result in unacceptable crop injury. Apply a minimum of two weeks before spear emergence. Scoring may result if a minimum of 0.5 inch of either rainfall or irrigation has not occurred two weeks prior to emergence.

TIMING TO WEEDS Burndown – Dormant Asparagus, Postemergence to Weeds

Zone Defense may be used for residual weed control, as well as to assist in postemergence burndown of many annual and perennial weeds where asparagus is dormant. For control of emerged weeds, tank mix Zone Defense with paraquat. Refer to paraquat label for rates and application parameters. To ensure thorough coverage, use a minimum of 15 gal of spray solution per acre. Zone Defense tank mixes applied to assist in the control of emerged weeds must be applied with a non-ionic surfactant at 0.25% v/v. A spray grade nitrogen source (either ammonium sulfate (AMS) at 2 to 2.5 lb/A or 28 to 32% nitrogen solution at 1 to 2 qt/A) may be added to increase herbicidal activity.

Burndown – After Last Harvest of Season, Postemergence to Weeds

Use Zone Defense for residual weed control and to assist in postemergence burndown for many annual and perennial weeds where asparagus harvest has been completed for the year. For control of emerged weeds, use a labeled tank mix partner with activity on the emerged weeds.

Preemergence – Dormant Asparagus or After Last Harvest of the Year, Preemergence to Weeds

Apply Zone Defense for the preemergence control of weeds listed in WEEDS CONTROLLED - ASPARAGUS.

NOTE: These Crop Specific Use directions are based upon the interactive effects of Zone Defense and the primary soil and environmental factors which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under Product Application Instructions Zone Defense. Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weed Controlled and any other section of this label pertinent to the anticipated crop use. It is important to note that not all varieties or cultivars of a given crop species have been evaluated under treatment with Zone Defense. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions.

DIRECTIONS FOR USE IN BRASSICA, HEAD AND STEM^[1]

Brassica Head and Stem Vegetable Crop Group 5-16 Includes:

Broccoli, Chinese broccoli, Brussels sprouts, Chinese (napa) cabbage, Chinese mustard, Cauliflower, Cavalo broccoli, Kohlrabi

[1 - Not for use in California.]

RESTRICTIONS

- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.096 flumioxazin) per acre of Zone Defense per application or per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** apply after crops are transplanted.
- This product must only be applied in row middles between raised plastic mulched beds that are at least 4 inches higher than the treated row middle and the mulched bed must have a minimum of a 24-inch bed width.
- Spray must remain between raised beds and contact no more than the bottom 1 inch of the side of the raised bed.
- All applications must be made with shielded or hooded equipment.

PRECAUTIONS

- Injury may occur to transplanted crops.
- Efficacy will be reduced if this product is applied to areas of standing water within the row middles.
- Injury can occur if soil particles treated with this product contact the crop.
- Irrigate treated field after application and prior to transplanting with minimum of 1/4 inch of water if rainfall does not occur between application and transplanting.

TABLE: BRASSICA RATE

Zone Defense Use Rates for Head and Stem Brassica Preplant Incorporated Applications			
Application rate	Ounces of Zone Defense per Acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	1.8 – 2.4	2.4 – 3.6	2.4 – 4.8
1.5 – 3.0 %	2.4 – 4.8	4.8 – 7.2	4.8 – 7.2
>3%	4.8 – 7.2	4.8 – 9.6	4.8 – 9.6
Refer to the use rate information on TABLE: SOIL CLASSIFICATION CHART for soil categories.			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
Zone Defense may be tank mixed with other herbicides registered for use in head and stem brassica. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.			

TABLE: WEEDS CONTROLLED - BRASSICA

When applied according to directions for use Zone Defense will provide control of the following weeds.

Lambsquarter, common	Hairy galinsoga	Tall waterhemp
Common waterhemp	Redroot pigweed	

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

TIMING TO BRASSICA

Refer to the **TABLE: BRASSICA RATE** for use rates and other specific use information. Apply the appropriate Zone Defense rate from **TABLE: BRASSICA RATE**, in a minimum of 10 gallons of finished spray per acre. Zone Defense may be applied at the rates specified in the **TABLE: BRASSICA RATE** as a shielded or hooded application to row middles after plastic is laid up to transplanting or seeding. Transplanting or seeding can take place any time after spray has dried. Spray must be applied to the row middle and contact no more than approximately the bottom 1 inch of the side of the raised bed. If the top of the mulch beds (where plants are to be transplanted) is contacted, severe injury can occur due to foliage contact with treated plastic.

NOTE: Not all head and stem brassica varieties or cultivars have been evaluated under treatment with Zone Defense Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions. These Head and Stem Brassica Specific Use directions are based upon the interactive effects of Zone Defense and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, Zone Defense Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

DIRECTIONS FOR USE IN DRY BEANS AND DRY PEAS

Dry cultivars of bean (*Lupinus*), bean (*Phaseolus*) (including field bean, lima bean (dry), navy bean, pinto bean, tepary bean), bean (*Vigna*) (including adzuki bean, blackeyed pea, catjang, cowpea, crowder pea, moth bean, mung bean, rice bean, southern pea, urd bean) broad bean (dry), chickpea (garbanzo bean), guar, lablab bean, lentil, pea (*Pisum*) (includes field pea) and pigeon pea

WEED SUPPRESSION IN DRY BEANS AND WEED CONTROL IN CHICKPEAS (GARBANZO BEAN) [Arizona, California, Colorado, Hawaii, Idaho, Montana, Nebraska, Oregon and Washington only.]

RESTRICTIONS - DRY BEANS AND DRY PEAS

- **DO NOT** apply more than 6.5 ounces (0.25 lb sulfentrazone) (0.61 flumioxazin) per acre of Zone Defense per application or per twelve-month period. The twelve-month period is considered to begin upon the initial Zone

Defense application.

- **DO NOT** apply after crop emerges, or if the seedling is close to the soil surface.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** incorporate to depths greater than 2 inches.
- **DO NOT** apply to frozen soils or to existing snow cover to prevent Zone Defense runoff from rain or snow melt that may occur following application.
- For Dry Beans and Chickpeas – **DO NOT** make more than 1 application of Valor Herbicide per acre per year.

PRECAUTIONS - DRY BEANS AND DRY PEAS

- Allow 7-14 days from application to planting when applying Zone Defense to coarse textured soils. Best results are achieved with Zone Defense when applications are made early preplant and greater than 14 days before planting.
- Under extended periods of dry weather, adequate weed control may not be achieved due to inadequate activation.
- Adverse crop response may occur in the following conditions (as such Zone Defense use rates should be reduced under these conditions):
 - on coarse textured soils with low organic matter (less than 1.5%) and pH of 7.8 or higher
 - on highly eroded soils
 - in areas of calcareous outcroppings.
- Additionally adverse crop response may occur if:
 - Inadequate seed furrow closure or shallow planting (less than 1.0 inch) may result in undesirable crop response.
 - Poor growing conditions such as excessive moisture, low temperatures, soil compaction and diseases.
- These Dry Bean Specific Use directions are based upon the interactive effects of Zone Defense and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, Zone Defense Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

TABLE: DRY SHELLED BEANS AND PEAS RATE

Zone Defense Use Rates for Dry Beans and Peas			
Prior to Planting, Preemergence (after planting) and Preplant Incorporated Applications			
Broadcast rate	Ounces of Zone Defense per Acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	1.8 – 2.4	2.4 – 3.6	2.4 – 3.6
1.5 – 3.0 %	2.4 – 3.6	3.0 – 4.8	3.6 – 4.8
>3%	3.0 – 4.8	3.6 – 5.5	4.3 – 6.5
Refer to the use rate information on TABLE: SOIL CLASSIFICATION CHART for soil categories.			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
Zone Defense may be tank mixed with other herbicides registered for use in dry beans. Observe all precautions, instructions and rotational cropping guidelines of each product’s label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.			

TABLE: WEEDS CONTROLLED – DRY BEANS AND PEAS

When applied according to directions for use Zone Defense will provide control of the following weeds.

Lambsquarter, common	Kochia*	Redstem filaree	Smooth pigweed
Common waterhemp	Palmer amaranth	Redroot pigweed	Tall morningglory
Eastern black nightshade	Prickly sida	Russian thistle	Tall waterhemp
Ivyleaf morningglory			
*ALS & Triazine Resistant			

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

TIMING TO DRY BEANS AND PEAS

Apply Zone Defense as a broadcast soil application at the following timings: early preplant (EPP), preemergence (after planting) (PRE) or preplant incorporated (PPI) for the control of broadleaf weeds and grasses in dry beans and dry peas. Refer to **TABLE: DRY SHELLLED BEANS AND PEAS RATE** for use rates and other specific use information. Broadcast apply the appropriate Zone Defense rate from table above, in a minimum of 10 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

Early Preplant (EPP) and Preemergence (PRE) - Spring Applications

Apply Zone Defense pre-plant on the soil surface in the spring to control weeds in dry peas. Zone Defense can be applied EPP prior to planting up to 2 days after planting as a PRE- soil application as long as seedlings have not broken the soil surface. Additionally, the seed furrow must be completely closed to avoid severe crop injury. For PRE-applications greater than 3 weeks prior to planting, use the high rate within the appropriate rate range for the soil and organic matter type listed in the use rate chart above table. Zone Defense can be tank mixed with other PRE-herbicides labeled for dry peas use. If dry conditions persist following PRE-application of Zone Defense, a shallow incorporation may be needed to incorporate and activate the herbicide. If weeds are emerged at the time of Zone Defense application, use a burndown herbicide at the full-labeled rate in combination with Zone Defense or split application as needed.

Preplant Incorporated (PPI)

Apply Zone Defense as a PPI treatment in the spring prior to planting in reduced and conventional tillage in dry pea. **DO NOT** incorporate to depths greater than 2 inches. Zone Defense can be tank mixed with other burndown such as glyphosate or paraquat or soil-applied herbicides labeled for use in dry bean or dry pea. Use the full, recommended rates of burndown herbicides, or split applications as needed. Observe all precautions, instructions, and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.

NOTE: Not all dry bean varieties or cultivars been evaluated under treatment with Zone Defense. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions.

DIRECTIONS FOR USE IN FRUITING VEGETABLE (EXCEPT CUCURBITS) AND OKRA

Fruiting Vegetable Crop Group 8-10 Includes:

African eggplant; Bush Tomato; Bell Pepper; Cocona; Currant Tomato; Eggplant, Garden Huckleberry; Goji Berry; Groundcherry, Martynia; Naranjilla; Okra, Pea Eggplant; Pepino; Nonbell Pepper; Roselle; Scarlet Eggplant; Sunberry; Tomatillo; Tomato; Tree Tomato; cultivars, varieties and/or hybrids of these.

RESTRICTIONS

- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.09 lb flumioxazin) of Zone Defense per acre per application.
- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.090 lb flumioxazin) per acre of Zone Defense or per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** make more than 4 applications per acre per year and do not exceed the maximum amount of Zone Defense per twelve-month period.
- All applications must be made with hooded or shielded equipment.

PRECAUTIONS

- Grow plants on raised or plastic mulched beds that are higher than the treated row middle.
- Spray must be directed to the row middle, away from the crop bed and with minimal contact with plastic, including the sides of the bed. If top of mulch beds (where plants are to be transplanted) is contacted, severe injury can occur due to foliage contact with treated plastic. In this scenario, a rainfall event of 1/2 inch (natural or irrigation) must occur prior to transplanting to reduce residues of this product.

- Injury can occur if soil particles treated with this product contact the crop.
- Irrigate treated field after application and prior to transplanting with minimum of 1/4 inch of water if rainfall does not occur between application and transplanting.
- These Fruit Vegetable and Okra Specific Use directions are based upon the interactive effects of Zone Defense and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, Zone Defense Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

TABLE: FRUITING VEGETABLES RATE

Zone Defense Use Rates for Fruiting Vegetable (Except Cucurbits) and Okra Preemergence Applications			
Application rate	Ounces of Zone Defense per Acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	1.8 – 2.4	2.4 – 3.6	2.4 – 4.8
1.5 – 3.0 %	2.4 – 4.8	4.8 – 7.2	4.8 – 7.2
>3%	4.8 – 7.2	4.8 – 9.6	4.8 – 9.6
Refer to the use rate information on TABLE: SOIL CLASSIFICATION CHART for soil categories.			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
Zone Defense may be tank mixed with other herbicides registered for use in fruiting vegetables and okra. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.			

TABLE: WEEDS CONTROLLED – FRUITING VEGETABLES

When applied according to directions for use Zone Defense will provide control of the following weeds.

Common lambsquarters	Ivyleaf morningglory	Tall waterhemp	Yellow nutsedge
Common waterhemp	Redroot pigweed		

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

ROW MIDDLES

- Grow plants on raised or plastic mulched beds that are higher than the treated row middle.
- Spray must be directed to the row middle, away from the crop bed and with minimal contact with plastic, including the sides of the bed. If top of mulch beds (where plants are to be transplanted) is contacted, severe injury can occur due to foliage contact with treated plastic. In this scenario, a rainfall event of ½ inch (natural or irrigation) must occur prior to transplanting to reduce Valor Herbicide residues.
- Injury can occur if soil particles treated with Valor Herbicide contact the crop.
- Irrigate treated field after application and prior to transplanting with minimum of 1/4 inch of water if rainfall does not occur between application and transplanting.
- All applications must be made with hooded or shielded equipment.

TIMING TO FRUITING VEGETABLES

Zone Defense may be applied at the rates specified in the **TABLE: FRUITING VEGETABLES RATE** as a hooded or shielded application to row middles up to 14 days prior to transplanting or seeding for preemergence control of the listed weeds as well as to assist in the postemergence control of emerged weeds.

Or an application of Zone Defense at 9.6 ounces per acre may be applied up to 21 days after transplanting or emergence if needed. Do not apply during or after bloom.

TIMING TO WEEDS

Zone Defense may be used for residual weed control, as well as to assist in postemergence burndown of many annual and perennial weeds in row middles. A registered preemergence grass herbicide may be added for control

of additional grassy weeds. For assisting in the control of emerged weeds, tank mix Zone Defense with paraquat or other registered burndown herbicide. Do not tank mix with glyphosate after transplanting or crop emergence. Refer to tank mix partner's label for rates and application parameters.

NOTE: Not all fruiting vegetable and okra varieties or cultivars have been evaluated under treatment with Zone Defense. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions.

DIRECTIONS FOR USE IN MINT (Peppermint and Spearmint)

RESTRICTIONS

- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.09 lb flumioxazin) of Zone Defense per acre per application.
- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.090 lb flumioxazin) per acre of Zone Defense or per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- Apply Zone Defense only to dormant mint before new growth emerges.
- **DO NOT** make more than 2 applications per acre per year and do not exceed the maximum amount of Zone Defense per twelve-month period.
- **DO NOT** make a sequential application of this product within 60 days of the first application of this product.
- Apply only to dormant mint. Application to non-dormant mint may result in unacceptable crop injury.
- **DO NOT** apply within 80 days of harvest.

PRECAUTIONS

- Emerged mint plants that are exposed to application will result in severe injury to exposed plant tissue.
- Applications should only be made to healthy mint fields. Application to unhealthy/stressed field may result in mint injury.
- Application to stands established longer than 3 years may result in crop injury.
- Use only on established meadow mint.
- Moisture in the form of rainfall or overhead irrigation is required after application to activate the herbicide
- These Mint Specific Use directions are based upon the interactive effects of Zone Defense and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, Zone Defense Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

TABLE: MINT RATE

Zone Defense Use Rates for Mint			
Preemergence Dormant or New Planting Applications			
Broadcast rate	Ounces of Zone Defense per Acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	3.6 – 4.8	4.8 – 6.6	6.6
1.5 – 3.0 %	4.8 – 6.6	6.6 – 8.1	8.1
>3%	6.6 – 8.1	8.1 – 9.6	9.6
Refer to the use rate information on TABLE: SOIL CLASSIFICATION CHART for soil categories.			
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
Zone Defense may be tank mixed with other herbicides registered for use in mint. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.			

TABLE: WEEDS CONTROLLED – MINT

When applied according to directions for use Zone Defense will provide control of the following weeds.

Catchweed Bedstraw	Kochia*	Redroot pigweed	Tall waterhemp
Common lambsquarters	Mayweed chamomile	Russian thistle	Yellow nutsedge
Common waterhemp	Powell pigweed	Sheperdspurse	Yellow toadflax
Eastern black nightshade	Ivyleaf morningglory		

*ALS & Triazine Resistant

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

TIMING TO MINT

Apply Zone Defense as a dormant application to established mint or as a PRE-application to new plantings. Refer to the Zone Defense **TABLE: MINT RATE** for use rates and other specific use information. Broadcast apply the appropriate Zone Defense rate from **TABLE: MINT RATE**, in a minimum of 10 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

Dormant Applications

Apply Zone Defense to established stands of dormant mint after post-harvest and/or spring land cultivation has been completed but before emergence of new mint growth. Split applications of Zone Defense may be used for preemergence control of winter annuals and summer annuals. Fall applications must be applied after post-harvest cultivation has been completed and spring application made after spring cultivation has been completed but before emergence of new mint growth. Apply Zone Defense in tank-mixtures with a registered burndown herbicide to control emerged weeds at the time of application. A surfactant is recommended with these tank mixtures to improve control of the emerged weeds. Zone Defense may also be applied in tank mixtures with other products registered for use in mint.

New Planting Applications

Apply Zone Defense as a PRE-treatment to new mint plantings preemergence to the weeds and mint. Reduce the rate of application approximately twenty five percent of the rate recommended for established plantings for particular soil characteristics. Refer to **TABLE: MINT RATE** for the appropriate use rate for the soil type and organic matter content. The higher rates in the range are recommended for soils of pH less than 7.0.

NOTE: Not all mint varieties or cultivars have been evaluated under treatment with Zone Defense. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions.

DIRECTIONS FOR USE IN PEANUTS Southeastern United State Only (AL, GA, MS, NC, SC, VA)

RESTRICTIONS

- **DO NOT** apply more than 7.8 ounces (0.3 lb sulfentrazone) (0.073 lb flumioxazin) of Zone Defense per acre during a single application.
- **DO NOT** apply more than 7.8 ounces (0.3 lb sulfentrazone) (0.073 lb flumioxazin) per acre of Zone Defense per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** feed treated peanut forage or peanut hay to livestock.
- **DO NOT** irrigate with water having a pH higher than 9.
- **DO NOT** irrigate when peanuts are cracking.
- **DO NOT** apply as at-cracking timing.
- **DO NOT** make more than 2 applications per acre per year and do not exceed the maximum amount of Zone Defense per twelve-month period.
- **DO NOT** graze treated fields or feed treated hay to livestock.

PRECAUTIONS

- These Peanut Specific Use directions are based upon the interactive effects of Zone Defense and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, Zone Defense Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

TABLE: PEANUT RATE AND WEEDS CONTROLLED

Zone Defense Use Rates and Weeds Controlled in Peanuts in Coarse Soils*		
Ounces of Zone Defense per Acre		
3.9 oz (0.15 lb sulfentrazone/A) (0.037 lb flumioxazin /A)	5.2 oz (0.2 lb sulfentrazone /A) (0.049 lb flumioxazin /A)	6.6 oz (0.25 lb/ sulfentrazone /A) (0.062 lb flumioxazin /A)
Common lambsquarters	Broadleaf signalgrass	Spurred anoda
Devilsclaw	Coffee senna	Common cocklebur
Entireleaf morningglory	Eclipta	Yellow nutsedge
Golden crownbeard	Goosegrass	Purple nutsedge***
Hophornbeam copperleaf	Large crabgrass	Common purslane
Jimsonweed	PA Smartweed (seedling)	Prickly sida
Red morningglory	Palmer Amaranth	Prickly starbur
Spleen amaranth	Pitted morningglory	
Tropic croton	Redweed	
	Smallflower morningglory	
	Southern crabgrass	
	Wild poinsettia**	
*Specified weeds are controlled in coarse (Sand end loamy sand) soils, medium and fine soils (sandy loam, clay loam, clay) or soils with organic matter greater than 1.0% should use the next higher rate in the table above. The next higher rate for 6.6 ounces (0.25 lb ai) should not exceed 9.6 ounces (0.3 lb ai) per acre.		
**Controls initial and several continuing flushes (germinations) of wild poinsettia.		
*** Purple nutsedge activity is based on PPI applications of Zone Defense. Preemergence surface applications may provide control (>85%) under certain circumstances. Otherwise purple nutsedge will be partially controlled (71 to 84%).		

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

TIMING TO DRY PEANUTS

Apply Zone Defense alone and in combinations in peanuts as a preemergence (PRE) or preplant incorporated (PPI) application. Apply Zone Defense alone or in combination with other registered herbicides for the control of key broadleaf and grass weeds in peanuts. Refer to the info below for specific use instructions. Only for use in the states of AL, GA, MS, NC, SC and VA.

Apply Zone Defense as a PPI application to a depth of 2 inches or less up to 14 days before planting. Also Zone Defense may be applied as a PRE soil surface application at planting or within 12 hours after planting. Incorporating deeper than 2 inches can result in adverse crop response and/or inconsistent weed control. **DO NOT** use Zone Defense for at-cracking applications or apply to exposed peanut tissue or severe injury/crop response will result. For best performance a tankmix of Zone Defense plus a grass herbicide labeled for peanuts is recommended. In situations where exceptionally high weed populations or when weeds not controlled by Zone Defense are anticipated the use of suitable post emergent peanut herbicides is recommended. Broadcast apply the correct Zone Defense use rate from **TABLE: PEANUT RATE AND WEEDS CONTROLLED** in a minimum 10 gallons of finished spray per acre. Adjust banded Zone Defense application rates in proportion to the broadcast rate.

In soils with pH > 7, use the next lower Zone Defense application rate. Irrigation with alkaline (pH 8 to 9) water can result in adverse crop response. The extent of crop response is dependent on Zone Defense application rate soil type (including %OM and pH) timing (after Zone Defense application relative to crop emergence) amount and pH of irrigation water. **DO NOT** irrigate with water greater than pH 9.

After peanuts are established (4 to 6 inches across in size) the alkalinity of irrigation water has minimal impact on crop growth.

NOTE: Not all peanut varieties or cultivars have been evaluated under treatment with Zone Defense. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions.

DIRECTIONS FOR USE IN SOYBEAN

RESTRICTIONS

- **DO NOT** apply more than 6.6 ounces (0.25 lb sulfentrazone) (0.062 lb flumioxazin) per acre of Zone Defense per application.
- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.090 lb flumioxazin) per acre of Zone Defense per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense application.
- **DO NOT** make more than 2 applications per acre per year and do not exceed the maximum amount of Zone Defense per twelve-month period.
- **DO NOT** graze treated fields or feed treated hay to livestock.
- **DO NOT** irrigate when soybeans are cracking.
- **DO NOT** apply Zone Defense if there are visible signs of cracking due to soybean emergence, or serious crop injury may result.
- **DO NOT** apply after crop seed germination.
- **DO NOT** tank mix Zone Defense with flufenacet or dimethenamid within 14 days of planting soybeans, unless soybeans are planted under no-till or minimum tillage conditions on wheat stubble or no-till field corn stubble.
- **DO NOT** tank mix Zone Defense at rates higher than 5.0 ounces per acre with metolachlor products.

PRECAUTIONS

- Tank mixes of Zone Defense at rates higher than 5.0 ounces per acre with metolachlor based products may result in severe injury to soybeans when application is followed by prolonged periods of cool wet weather and should not be used.
- **Use of Zone Defense on soils which exceed pH 6.8 may result in unacceptable injury to the following crop. Zone Defense may be used on fields which are generally pH 6.8 or less, but which may contain isolated areas where the pH exceeds 6.8 only if the following rotational crop is soybeans.**
- Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in the **TABLE: SOYBEAN RATE**. See **IMPORTANCE OF SOIL PH section** for details.
- All direct or indirect contact (such as spray drift) to other crops or to land scheduled to be planted to crops other than soybeans should be avoided.
- Soybean stunting may occur if excessive rainfall occurs after application but before soybeans emerge. Injury is more prevalent under poor drainage or compacted conditions or when soil is saturated for long periods of time. Soybeans rapidly outgrow stunting once favorable growing conditions return.
- Seedling disease, nematodes, cold weather, deep planting (more than 2"), excessive moisture, high salt concentration, or drought may weaken soybean seedlings and increase the possibility of crop injury.
- Thoroughly clean Zone Defense from application equipment immediately after use and prior to spraying crops other than soybeans. Failure to remove even small amounts of Zone Defense from application equipment may result in injury to subsequently sprayed crops. See **SPRAYER CLEANOUT** for more information.

TABLE: SOYBEAN RATE

Zone Defense Use Rates for Soybeans			
Broadcast rate	Ounces of Zone Defense per Acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
0.5 – 2.0 %	3.5 – 4.0	4.5 – 5.5	5.0 – 6.0
2.0 – 4.0 %	4.0 – 5.0	5.0 – 6.0	6.0 – 6.6

Refer to the use rate information on **TABLE: SOIL CLASSIFICATION CHART** for soil categories.

Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.

Zone Defense may be tank mixed with other herbicides registered for use in soybeans. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.

TABLE: WEEDS CONTROLLED - PREEMERGE

When used as directed Zone Defense will provide control of the following weed species:

Anoda, Spurred	Nightshade, Black
Bedstraw, Catchweed	Nightshade, Eastern Black
Carpetweed	Nutsedge, Purple
Chickweed, Common	Nutsedge, Yellow
Copperleaf, Hophornbeam	Orchardgrass
Copperleaf, Virginia	Pigweed, Livid
Croton, Tropic	Pigweed, Palmer amaranth
Crownbeard, Golden	Pigweed, Powell
Cupgrass, Woolly	Pigweed, Redroot
Daisy, American	Pigweed, Smooth
Devilsclaw	Pigweed, Spiny amaranth
Eclipta	Pigweed, Spleen
Filaree, Redstem	Plantain, Blackseed
Flixweed	Plantain, Narrowleaved
Galinsoga, Hairy	Poinsettia, wild
Jimsonweed	Poorjoe
Ladysthumb	Purslane, Common
Lambsquarters, Common	Redsmaid
Lettuce, Miners	Redweed
Mallow, Common	Sedge, Annual
Mayweed/False Chamomile	Senna, Coffee
Milkweed, Honeyvine	Shepherd's Purse
Morningglory, Entireleaf	Sida, Prickly
Morningglory, Ivyleaf	Stinkgrass
Morningglory, Palmleaf	Tasselflower, Red
Morningglory, Purple	Thistle, Russian
Morningglory, Red/Scarlet	Toadflax, Yellow
Morningglory, Smallflower	Waterhemp, Common
Morningglory, Tall	Waterhemp, Tall

Morningglory, Annual	Witchgrass
Mustard, Tumble	

Weed species which can germinate deep in the soil such as morningglory or other weeds; such as nutsedge, which may emerge at various times during the growing season may require a cultivation or a follow up application of postemergence herbicides for season-long control.

TABLE: Zone Defense will provide partial control of the following weeds when used as directed:

Barnyardgrass	Ragweed, Common
Bluegrass, Annual	Ragweed, Giant*
Bristly Starbur	Russian Thistle
Burcucumber	Ryegrass, Italian
Crabgrass	Sesbania, Hemp
Foxtail, species	Sicklepod
Goosegrass	Signalgrass, broadleaf
Hophornbean Copperleaf	Smartweed, Ladysthumb
Johnsongrass, seedling	Smartweed, Pennsylvania
Kochia	Smellmelon
Mexicanweed	Velvetleaf
Panicum, Fall	Wild Buckwheat
Panicum, Texas	Wormwood, Biennial

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

TIMING TO SOYBEANS

Zone Defense may be applied to soybeans prior to planting or preemergence (after planting). Preemergence application of Zone Defense must be made within 3 days after planting and prior to soybean emergence. Application after the soybeans have begun to crack, or are emerged, will result in severe crop injury. Application should not be made when soybeans have begun to crack. Select Zone Defense rate from **TABLE: SOYBEAN RATE** according to anticipated weed spectrum.

APPLICATION METHODS

DO NOT apply Zone Defense after the soybean crop has emerged or severe injury or death of the crop may occur. Zone Defense may be applied by any of the methods listed below.

CONSERVATION TILLAGE

Early Pre-Plant in No-Till, Minimum Till, or Stale Seedbed

Zone Defense applied Early Pre-plant must be applied in combination with the appropriate burndown herbicide such as glyphosate, glufosinate, paraquat, and/or 2,4-D to achieve acceptable control of existing weeds during application. Zone Defense is rainfast after one hour when applied as a burndown treatment. For burndown or control of existing vegetation, an appropriate burndown herbicide at labeled rates is recommended such as glyphosate etc. Follow all label directions for the burndown herbicide including application timing, spray volume, adjuvants to achieve control of targeted weeds. For applications of Zone Defense made from 30 - 60 days before planting apply the higher rate in the appropriate soil range from **TABLE: SOYBEAN RATE** depending on the soybean system being grown.

PRE-EMERGENCE

Zone Defense may be applied at planting time or within 3 days after planting, but before seed emergence. Zone Defense may be applied alone or in tank mix combinations with other registered soybean herbicides. When applied in tank mix combinations, follow applicable use directions, including application rates, precautions and restrictions of each product in the mixture. The seed furrow should be completely closed and seed covered before any applications of Zone Defense.

PRE-PLANT INCORPORATED

Uniformly incorporate Zone Defense or Zone Defense tank mixes no deeper than 2" prior to planting soybeans. If tank-mixing Zone Defense with a companion herbicide, follow all label instructions for proper incorporation of the companion herbicide in the top 2" of soil. Improper incorporation can result in erratic weed control or potential crop injury.

NOTE: Not all soybean varieties or cultivars have been evaluated under treatment with Zone Defense. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions.

DIRECTIONS FOR USE IN STRAWBERRY

RESTRICTIONS

- **DO NOT** apply more than 9.6 ounces (0.375 pound active) (0.090 lb flumioxazin) per acre of Zone Defense per application or per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense application.
- **DO NOT** apply directly on the crop after the crop emerges or if the seedling sprouts are close to the soil surface.

PRECAUTIONS

These Strawberry Specific Use directions are based upon the interactive effects of Zone Defense and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, Zone Defense Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

TABLE: STRAWBERRY RATE

Zone Defense Use Rates for Strawberry Preemergence Application Dormant and Renovation Application - IA, OH, OR, MI, WA and WI Only			
Broadcast rate	Ounces of Zone Defense per Acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	1.8 – 2.4	2.4 – 3.6	2.4 – 4.8
1.5 – 3.0 %	2.4 - 4.8	4.8 – 7.2	4.8 – 7.2
>3%	4.8 – 7.2	4.8 – 9.6	4.8 – 9.6
Refer to the use rate information on TABLE: SOIL CLASSIFICATION CHART for soil categories. Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.			
Zone Defense may be tank mixed with other herbicides registered for use in strawberry. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.			

TABLE: WEEDS CONTROLLED – STRAWBERRY

When applied according to directions, Zone Defense will provide control of:

Chickweed	Field pansy	Pineapple weed	Tall waterhemp
Common lambsquarters	Henbit	Prostrate knotweed	White campion
Common groundsel	Ivyleaf morningglory	Redroot pigweed	Wild buckwheat
Common waterhemp	Mayweed	Sheperdspurse	Yellow nutsedge
Corn spurry	Nightshade	Sowthistle	Yellow woodsorrel

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

TIMING TO CROP - STRAWBERRY

Apply Zone Defense as a Preemergence (PRE) application by ground in strawberry. Refer to the Zone Defense **TABLE: STRAWBERRY RATE** for use rates and other specific use information. Broadcast apply the appropriate Zone Defense rate from **TABLE: STRAWBERRY RATE**, in 10 to 40 gallons of finished spray per acre. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

TIMING TO WEED - Preemergence (PRE)

Apply Zone Defense prior to planting and before seedlings have emerged. Application after crop emergence may cause severe injury to the crop. Zone Defense can be applied alone or in combination with other labeled strawberry herbicides. Zone Defense may be followed by labeled postemergence strawberry herbicides for increased control of grass and broadleaf weeds. Always follow the most restrictive label when tank mixing. When using this product in no-till or minimum till cropping systems, tank mix with an appropriate burndown herbicide for improved control of existing weeds.

NOTE: Not all strawberry varieties or cultivars have been evaluated under treatment with Zone Defense. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions.

DIRECTIONS FOR USE IN SUGARCANE

RESTRICTIONS

- **DO NOT** apply within 120 days of harvest.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- **DO NOT** allow spray to contact crop leaves.
- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.09 lb flumioxazin) of Zone Defense per acre per application.
- **DO NOT** apply more than 9.6 ounces (0.375 lb active) (0.090 lb flumioxazin) per acre of Zone Defense per acre per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense application.
- **DO NOT** make a sequential application within 14 days of the first application.
- **DO NOT** make more than 2 applications of Zone Defense per acre per year and do not exceed the maximum amount of Zone Defense per twelve-month period.

PRECAUTIONS

These Sugarcane Specific Use directions are based upon the interactive effects of Zone Defense and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, Zone Defense Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

TABLE: SUGARCANE RATE

Zone Defense Use Rates for Sugarcane Planting Time and Lay-by Applications			
Broadcast rate	Ounces of Zone Defense per Acre		
	Soil Texture		
% Organic Matter	Coarse	Medium	Fine
<1.5 %	3.6 – 4.8	4.8 – 6.6	6.6
1.5 – 3.0 %	4.8 – 6.8	6.6 – 8.1	8.1
>3%	6.6 – 8.1	8.1 – 9.6	9.6

Refer to the use rate information on **TABLE: SOIL CLASSIFICATION CHART** for soil categories.
Use higher rates for soils with pH less than 7.0 and lower rates for soils with pH greater than 7.0 within the given rate ranges in this table.

Zone Defense may be tank mixed with other herbicides registered for use in sugarcane. Observe all precautions, instructions and rotational cropping guidelines of each product's label when tank mixing, including all references to potential carryover and crop injury warnings or restrictions.

TABLE: WEEDS CONTROLLED – SUGARCANE

When applied according to directions, Zone Defense will provide control of:

Entireleaf morningglory	Red morningglory	Tall morningglory	Yellow nutsedge
Ivyleaf morningglory	Redroot pigweed		

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

TIMING TO CROP - SUGARCANE

Apply Zone Defense as a broadcast or banded preemerge (PRE) soil applied treatment for the control of broadleaf weeds, grasses and sedges in sugarcane. Additionally may be used as a directed lay-by (LB) at the lay-by timing. Refer to the Zone Defense **TABLE: SUGARCANE RATE** for use rates and other specific use information. For at planting applications apply v in sugarcane with aerial or ground equipment calibrated to deliver a minimum of 5 gallons of finished spray by air and a minimum of 15 gallons of finished spray by ground. In layby applications apply Zone Defense in sugarcane with ground equipment calibrated to deliver a minimum 15 gallons of finished spray by ground application. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets. Apply sufficient spray volume to achieve adequate coverage.

Planting Time Applications

Apply Zone Defense preemerge to newly planted or ratoon sugarcane. The higher rate should be used on clay soils and/or soils with organic matter content higher than 2 percent. Application may be made by air or ground. For aerial application, apply in a minimum of 5 gallons of spray per acre or by ground equipment in a minimum of 15 gallons of spray per acre.

Lay-by Applications

Zone Defense may be applied as a directed spray to sugarcane at lay-by timing to upright and PINEAPPLE” varieties after the sugarcane has exceeded 30 inches in height and the spray solution will not contact foliage above 6 inches from the base of the sugarcane. The higher rate should be used on clay soils and/or soils with organic matter content higher than 2 percent. Apply as a directed spray with ground equipment in a minimum of 15 gallons of spray per acre.

NOTE: Not all sugarcane varieties or cultivars have been evaluated under treatment with Zone Defense Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions.

FOR USE IN SPRING WHEAT

For Use Only in Pacific Northwest States – ID, OR, WA

RESTRICTIONS

- **DO NOT** apply more than 4.8 ounces (0.188 lb sulfentrazone) (0.045 lb flumioxazin) per acre of Zone Defense per application or per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense application.
- **DO NOT** make more than one Zone Defense application per acre per 12 month period.
- The twelve-month period is considered to begin upon the initial Zone Defense application.
- **DO NOT use on soils classified as sand, which have less than 1% organic matter.**
- For pre-plant weed control, use only on no-till or minimum tillage fields where the previous year's crop residue has not been incorporated into the soil.
- Wheat must be planted a minimum of 1 inch deep.
- **DO NOT** graze until wheat has reached 5 inches in height.
- **DO NOT** irrigate between emergence and spike.

PRECAUTIONS

These Spring Wheat Specific Use directions are based upon the interactive effects of Zone Defense and the primary soil and environmental factors that affect its activity on various weed species and crop tolerance. The user must observe all instructions and guidance previously presented under Application Instructions, Zone Defense Product Use Rates, Rotational Crop Guidelines, Replanting Instructions, Weeds Controlled and any other section of this label pertinent to anticipated crop use.

RATES – SPRING WHEAT

Apply 4.8 ounces (0.188 lb sulfentrazone) (0.045 lb flumioxazin) per acre using 10 to 40 gallons of finished spray per acre.

TABLE: WEEDS CONTROLLED – SPRING WHEAT

When applied according to directions, Zone Defense will provide control of:

Kochia*	Russian thistle
*ALS & Triazine Resistant	

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

TIMING TO CROP – SPRING WHEAT

Apply Zone Defense as a preplant (PP) or preemergence (PRE) application 40 to 60 days before forage cutting or 120 days before grain harvest. **This use is limited to the Pacific Northwest ONLY.**

NOTE: Not all spring wheat varieties or cultivars have been evaluated under treatment with Zone Defense. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions.

DIRECTIONS FOR USE IN PERMANENT CROPS

ALMONDS, APPLES, BUSHBERRY, CANEBERRY, CITRUS FRUIT, GRAPE AND NUT TREES (INCLUDING PISTACHIOS)

Apple, *Malus domestica* Borkh.

Bushberry [Crop Subgroup 13-07B Includes]: Aronia Berry; Blueberry, Highbush; Blueberry, Lowbush; Buffalo Currant; Chilean Guava; Cranberry, Highbush; Currant, Black; Currant, Red; Elderberry, European Barberry, Gooseberry, Honeysuckle, edible; Huckleberry; Jostaberry; Juneberry [(Saskatoon Berry)]; Lingonberry; Native Currant; Salal; Sea Buckthorn; [and] [cultivars, [varieties] [and/or] [hybrids] [of these].

Caneberry Crop Subgroup 13-07A Includes: Blackberry, Loganberry, Black Raspberry, Red Raspberry, Wild Raspberry [and] cultivars, varieties and/or hybrids of these.

Citrus Fruit Crop Group 10-10 Includes: Australian Desert Lime; Australian Finger-lime; Australian Round Lime; Brown River Finger Lime; Calamondin; Citron; Citrus hybrids; Grapefruit; Japanese Summer Grapefruit; Kumquat; Lemon; Lime; Mediterranean Mandarin; Mount White Lime; New Guinea Wild Lime; Orange, Sour; Orange, Sweet; Pummelo; Russell River Lime; Satsuma Mandarin; Sweet Lime; Tachibana Orange; Tahiti Lime; Tangelo; Tangerine (mandarin); Tangor; Trifoliate Orange; Uniq Fruit; [and] cultivars, varieties and/or hybrids of these.

Grapes: Wine Raisin Table and Juice Amur river grape.

Tree Nut [Crop Group 14-12 Includes]: [African Nut-tree;] Almond, Beechnut; Brazil Nut; [Brazilian Pine;] Bunya;] [Bur Oak;] Butternut; [Cajou Nut;] [Candlenut;] Cashew; Chestnut; Chinquapin; Coconut; [Coquito Nut;] [Dika Nut;] Ginkgo; [Guiana Chestnut;] Hazelnut (Filbert); Heartnut; Hickory Nut; [Japanese Horse-chestnut;] Macadamia Nut; [Mongongo Nut;] [Monkey-pot;] [Monkey Puzzle Nut;] [Okari Nut;] [Pachira Nut;] [Peach Palm

Nut;] Pecan; [Pequi;] Pili Nut; Pine Nut; Pistachio; [Sapucaia Nut;] Tropical Almond; Walnut, Black; Walnut, English; [Yellowhorn,] [and] [cultivars, [varieties] [and/or] [hybrids] [of these].

RESTRICTIONS

- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.090 lb flumioxazin) of Zone Defense per acre per application.
- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.090 lb flumioxazin) of Zone Defense per acre per year.
- **DO NOT** make more than 2 applications of Zone Defense per acre per year and do not exceed the maximum amount of Zone Defense per twelve-month period.
- **DO NOT** make a sequential application within 30 days of the first application, except tree nuts.
- For Tree Nuts, **DO NOT** make a sequential application within 60 days of the first application.
- **DO NOT** apply to farm alleys or roads where traffic may result in treated dust settling onto crops or other desirable vegetation.
- **DO NOT** apply using an airblast sprayer or by air. Use ground equipment only.
- **DO NOT** apply using pressurized handgun.
- **DO NOT** apply within 300 yards of non-dormant pome fruit and stone fruit.
- Apply to crops that have been growing for at least one full year and are in good condition.
- **DO NOT** apply to powdery soils or soils that are susceptible to wind displacement unless irrigation can be applied immediately after application.
- **DO NOT** mow treated areas between bud break and final harvest. Dust created by mowing may drift onto desirable vegetation resulting in injury.
- **DO NOT** apply to tree nuts established less than one year, unless protected from spray contact by nonporous wraps, grow tubes, or waxed containers.
- **DO NOT** tank mix with other products containing flumioxazin or sulfentrazone.
- Follow the most restrictive label of tank mix partners including all references to potential carryover and crop injury warnings and restrictions.
- If two banded treatments are made in a growing season allow a minimum of 60 days between applications however **DO NOT** exceed the specified seasonal maximum use rate.
- **Preharvest Interval (PHI):**
 - Citrus Fruit: 3 days
 - Bushberries: 7 days
 - Caneberries: 7 days
 - Grape: 60 days
 - Tree Nuts: 60 days
 - Apples: 60 days

PRECAUTION

- Avoid direct or indirect spray contact to foliage and green bark (wrap trunk with non-porous wrap grow tubes or wax containers to keep spray solution off of green tissue).

RESTRICTION– APPLES ONLY

- **DO NOT** apply in apple orchard after petal fall.

PRECAUTIONS

These Crop Specific Use directions are based upon the interactive effects of Zone Defense and the primary soil and environmental factors which affect its activity on various weed species and tolerance among crops. The user is required to observe the instructions and guidance previously presented under Product Application Instructions. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions. HELM Agro does not recommend tank mixing this product with other products containing other group 14 herbicides as crop injury may occur.

- Raise mower height during all mowing to reduce dust. Dust created by mowing can drift onto desirable vegetation resulting in injury.
- Follow the most restrictive label limitations and precautions of the tank mix product(s) being used.
- Avoid direct or indirect spray contact to foliage and green bark or canes (non-barked trunk and non-barked vines with the exception of undesirable suckers).
- Irrigate after application with minimum of 1/4 inch of water to activate the herbicide and to reduce wind displacement of soil.

USE PRECAUTIONS FOR BUSHBERRIES

If bushberries are established less than 2 years ensure that they are protected from spray contact by non-porous wrap, grow tubes or waxed containers.

USE PRECAUTIONS FOR GRAPES

If grapes are established less than 2 years ensure that they are trellised at least 3 ft from the soil surface or are protected from spray contact by non-porous wrap, grow tubes or waxed containers.

Apply only to grapes that are trellised, staked or are free standing.

Avoid direct or indirect spray contact to foliage and green bark (non-barked vines, with the exception of undesirable suckers).

Plant new plantings of “own-rooted varieties”, for example Concord, so that all roots are a minimum 8 inches below the soil surface to be treated. In some situations, this may require hilling soil around newly planted vines so that the settled depth of the hill will be 4 to 5 inches above the vineyard floor.

Juice, Raisin and Wine Grapes

If applied during the period after bud break through final harvest, use shielded application equipment and applicator can ensure spray drift will not come in contact with crop fruit or foliage.

Table Grapes

Apply Zone Defense between final harvest up to bud break.

USE PRECAUTIONS FOR CITRUS FRUIT AND TREE NUTS

- For tree nuts apply after bud break through final harvest using shielded application equipment if the applicator can ensure the spray drift will not come into contact with non-target vegetation, crop fruit and/or foliage. Shielded application equipment is not required if the following application parameters are followed:
 - Application pressure (at boom) < 30 PSI.
 - Application speed < 5 MPH.
 - Applicator can ensure the spray drift will not come into contact with non-target vegetation, crop fruit and/or foliage.
- If application is made to trees established less than one year, ensure that they are protected from spray contact
 - by non-porous wraps, grow tubes, paint or waxed containers.
- If application is made to trees established less than one year, ensure that they are protected from spray contact by non-porous wraps, grow tubes, paint or waxed containers.
 - For apples east of the Cascade Mountains in Washington, follow the restrictions above plus:
 - Apply between final harvest and January 1.
 - Apply only to apple blocks with an established (2 years or older) permanent cover crop that covers a minimum of 60% of the surface area in the block.
 - Application must be incorporated with a minimum of one half inch of water within 48 hours after application.
 - Apply only to orchard berms.
 - **California only:** See use precautions and stone fruit in the counties of Merced, San Joaquin and Stanislaus section of this label.

USE PRECAUTIONS ON ALMOND IN DEFINED AREAS OF MERCED, SAN JOAQUIN AND STANISLAUS COUNTIES OF CALIFORNIA

The use of Zone Defense in soils common in parts of Merced, San Joaquin and Stanislaus counties in California is known to have resulted in injury to almonds under drought stress conditions. These soils are characterized by having been cut or filled, high sand content, low clay content and shallow profiles. Growers in the Defined Area must be aware and assume the risk of using Zone Defense on almond.

The Defined Area can be seen on the Map or by the description that follows:

- Intersection of Highway 4 and Escalon-Bellota Road at Farmington in San Joaquin County;
- Directly South on Escalon-Bellota to the Santa Fe Avenue and railroad tracks at Escalon
- Southeast on Santa Fe Avenue down to the Merced River;
- East following the Merced River to the Merced/Mariposa County line;
- Northwest following the Merced County line through the intersection of Merced and Stanislaus County line following the Stanislaus/Tuolumne County and Calaveras County line to Highway 4;
- West on Highway 4 back to the Farmington intersection of Escalon-Bellota Road.



REPLANTING IN NEW OR ESTABLISHED ORCHARDS AND VINEYARDS

Delay replanting replacement trees and vines for at least 30 days after Zone Defense applications in newly planted and established orchards and vineyards. Use untreated soil when replanting trees and vines.

WEED CONTROL INFORMATION

Zone Defense is a selective soil applied herbicide for the control of susceptible broadleaf grass and sedge weeds found in **TABLE: WEEDS CONTROLLED - APPLES, BUSHBERRIES, CITRUS FRUIT, GRAPE AND NUT TREES** and **TABLE: PERENNIAL SEDGE CONTROL INCLUDING NUTSEGE - APPLES, BUSHBERRIES, CITRUS FRUIT, GRAPE AND NUT TREES**. Adequate moisture of at least 1/2 inch is required within 14 days after application for optimal control. If adequate rainfall is not received in a timely fashion irrigate with a minimum of 1/2 inch of water. When activating moisture is delayed a reduced level of weed control may occur. These escaped weeds can be removed using a burndown herbicide. Tank mix Zone Defense with a burndown herbicide and use an appropriate adjuvant when weeds are present at the time of application. Refer to the tank mix partners product label for the proper use rates by weed sizes. Use the most restrictive label limitations and precautions of the tank mix product(s). Residual weed control may be reduced when Zone Defense is applied where heavy crop trash such as leaves and branches and /or weed residues exists. It is best to rake or blow off the leaves and trash when they fall and prior to the Zone Defense application.

TABLE: WEEDS CONTROLLED - APPLES, BUSHBERRIES, CITRUS FRUIT, GRAPE AND NUT TREES

When applied according to directions for use Zone Defense will provide control of the following weeds.

Amaranth livid	Eveningprimrose cutleaf	Mallow common	Porophyllum
Amaranth Palmer	Fescue Red	Mallow little	Poinsettia wild
Amaranth Powell	Fiddleneck species	Mayweed Chamomile	Puncturevine
Amaranth spiny	Filaree broadleaf	Milkweed honeyvine	Purslane common
Amaranth spleen	Filaree redstem	Morningglory entireleaf	Redmaids
Anoda spurred	Filaree whitestem	Morningglory ivyleaf	Redweed
Barnyardgrass common	Fleabane hairy	Morningglory palmleaf	Radish Wild
Bedstraw catchweed	Flixweed	Morningglory purple	Rocket London
Bindweed field	Foxtail bristly	Morningglory red	Sandbur
Bluegrass annual	Foxtail giant	Morningglory scarlet	Sedge annual
Bromegrass species	Foxtail green	Morningglory smallflower	Senna coffee
Burclover California	Foxtail yellow	Morningglory tall	Sheperdspurse
Carpetweed	Galinsoga hairy	Mullein turkey	Sida prickly
Cheatgrass	Goosegrass	Mustard Species	Sida Southern
Cheeseweed species	Goosefoot nettleleaf	Mustard tumble	Signalgrass broadleaf
Chickweed common	Groundcherry clammy (seedling)	Nettle burning	Smartweed PA (seedling)
Clover species	Groundcherry cutleaf	Nightshade black	Smellmellon
Copperleaf hophornbeam	Groundsel common	Nightshade Eastern black	Sowthistle species
Copperleaf Virginia	Henbit	Nutsedge purple	Srangletop red
Crabgrass large	Horseweed (Marestail)	Nutsedge yellow	Spurge spotted
Crabgrass smooth	Ryegrass Italian	Orchardgrass	Starbur bristly
Crabgrass Southern	Jimsonweed	Panicum fall	Stinkgrass
Croton tropic	Johnsongrass	Pigweed prostrate	Toadflax yellow
Crownbeard golden	Junglerice	Pigweed redroot	Tassleflower red
Cupgrass wooly	Knotweed common	Pigweed smooth	Thistle Russian
Cyperus hedgehog	Kochia (ALS/Triazane Resistant)	Pigweed Tumble	Waterhemp common
Daisy American	Ladysthumb	Pineapple weed	Waterhemp tall
Devilsclaw	Lambsquarters common	Plantain blackseed	Waterprimrose winged
Dock curly	Lettuce miners	Plantain narrow leaved	Willowleaf panicle leaf
Eclipta	Lovegrass species	Poorjoe	Witchgrass

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

ANNUAL AND PERENNIAL SEDGE CONTROL INCLUDING NUTSEGE

Applying Zone Defense at 9.6 ounces (0.375 lb sulfentrazone) per acre may provide control or suppression of sedges whether applied preemergence or postemergence to the sedges. Soil uptake is the major means of uptake by sedges. Postemergence applications to sedges allow Zone Defense to be taken into the sedge through the foliage as well as soil uptake through the roots. Good spray coverage is required for optimum control of sedges especially when applying postemergence to the sedges. Use a quality nonionic surfactant (NIS) at the rate of 0.25% v/v when applying postemergence.

TABLE: PERENNIAL SEDGE CONTROL INCLUDING NUTSEGE - WEEDS CONTROLLED - APPLES, BUSHBERRIES, CITRUS FRUIT, GRAPE AND NUT TREES

When applied according to directions for use Zone Defense will provide control of the following weeds.

Kyllinga, green	Nutsedge, purple*	Sedge, cylindrical	Sedge, Surinam
Kyllinga, false green	Nutsedge, yellow	Sedge, globe	Sedge, Texas

* Split applications of Zone Defense may optimize purple nutsedge control. Apply 3.25 - 5 ounces (0.126 - 0.188 lb sulfentrazone) per acre followed by a second application, at least 30 days after first application, to actively growing purple nutsedge. **DO NOT** exceed the maximum rate of 9.6 ounces (0.375 lb sulfentrazone) per acre per season. Zone Defense symptoms on purple nutsedge include reduced nutsedge stands, necrosis, chlorosis, and/or stunting. Optimum control may not be observed until the second year after the original treatment.

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

TABLE: PERMANENT CROPS (ALMONDS, APPLES, BUSHBERRY, CANEBERRY, CITRUS FRUIT, GRAPE AND NUT TREES (INCLUDING PISTACHIOS) RATE

Zone Defense Use Rates for Permanent Crops ALMONDS, APPLES, BUSHBERRY, CANEBERRY, CITRUS FRUIT, GRAPE AND NUT TREES (INCLUDING PISTACHIOS)
Dry Ounces of Zone Defense per Acre
3.25 – 9.6 (0.125 – 0.375 lb sulfentrazone) (0.126 - 0.90 lb flumioxazin) per acre
Zone Defense may be tank mixed with other herbicides registered for use in Permanent Crops.

APPLICATION INFORMATION - ALMONDS, APPLES, BUSHBERRY, CANEBERRY, CITRUS FRUIT, GRAPE AND NUT TREES (INCLUDING PISTACHIOS)

Apply Zone Defense as a uniform broadcast soil application to orchard floors and vineyard floor and to berry beds and furrows or a uniform banded application directed to the base of the trunk in trees and vines and to the base of the berry and beds in berries for preemergence (PRE) control of the weeds found in **TABLE: WEEDS CONTROLLED - APPLES, BUSHBERRIES, CITRUS FRUIT, GRAPE AND NUT TREES** and **TABLE: PERENNIAL SEDGE CONTROL INCLUDING NUTSEGE - APPLES, BUSHBERRIES, CITRUS FRUIT, GRAPE AND NUT TREES**. For apple, HAI 37 HERBICIDE can only be applied as a uniform band directed at the base of the trunk prior to "silver tip". Use a minimum of 10 gallons of spray solution per acre to ensure uniform spray coverage. Nozzle selection should meet manufacturer's spray volume and pressure recommendations for preemergence and postemergence herbicide applications. Apply sufficient spray volume to achieve adequate coverage. Use nozzle types and arrangements that will provide optimum coverage while producing a minimal amount of fine droplets.

For improved weed management Zone Defense can be applied in a tank mixture with other preemergence and postemergence burndown herbicides. Refer to the tank mix partners labels for additional restrictions including minimum spray volumes and crops in which they are labeled. Burndown herbicides may include but are not limited to glyphosate, Paraquat, Rely and 2,4-D.

When applied as a banded treatment (50% band or less) refer to formula in chart below for rate and volume. Zone Defense may be applied twice per year. Allow a minimum of 60 days between applications unless otherwise specified on the label or separate published Helm Agro recommendations.

For band treatments apply the broadcast equivalent rate and volume per acre. To determine these:

$$\frac{\text{Banded Width in Feet}}{\text{Row Width in Feet}} \times \text{Broadcast Rate Per Acre} = \text{Band Rate}$$

$$\text{Band Width in Feet} \times \text{Broadcast Volume Per Acre} = \text{Band Volume}$$

A minimum of 10 gallons of spray solution per acre should be used to ensure uniform spray coverage. Nozzle selection should meet manufacturers spray volume and pressure recommendations for preemergence and postemergence herbicide applications. The spray solution should have a pH between 5.0 and 9.0.

Apply Zone Defense only be to crops that have been established for one full growing season and are in good health and exhibit good vigor. Avoid allowing spray to come in contact with green bark or green tissue of trunks of young vines and trees by wrapping the trunk with a nonporous wrap, grow tubes or wax containers. Failure to do so may result in severe crop injury. Avoid direct or indirect spray contact with crop foliage and fruit.

Best results will be obtained when the soil is moist at the time of application and the application will be followed by at least 4 inches of rainfall or sprinkler irrigation within two weeks after application. Applications should be timed to take advantage of normal rainfall patterns and cool temperatures especially where drip or micro sprinkler irrigation is used which may not uniformly incorporate the herbicide.

Zone Defense is a selective soil applied herbicide for the control of susceptible broadleaf grass and sedge weeds found in **TABLE: WEEDS CONTROLLED - APPLES, BUSHBERRIES, CITRUS FRUIT, GRAPE AND NUT**

TREES and TABLE: PERENNIAL SEDGE CONTROL INCLUDING NUTSEDGE - WEEDS CONTROLLED - APPLES, BUSHBERRIES, CITRUS FRUIT, GRAPE AND NUT TREES. At least 0.5 inch of moisture is required within 14 days after application for optimal control. If adequate rainfall is not received in a timely fashion, irrigate with a minimum of 0.5 inch of irrigation. If activating moisture is delayed a reduced level of weed control may occur. These escaped weeds can be removed using a postemergence burndown herbicide.

When weeds are present at the time of application, tank mix Zone Defense with a burndown herbicide and use an appropriate adjuvant. Refer to the tank mix partners product label for the proper use rates by weed sizes. Use the most restrictive label limitations and precautions of the tank mix product(s).

Residual weed control may be reduced when Zone Defense is applied where heavy crop trash such as leaves and branches and/or weed residues exists. Prior to the Zone Defense application it is best to rake or blow off the leaves and trash when they fall so the spray solution can reach soil surface.

NOTE: Not all permanent crop varieties or cultivars have been evaluated under treatment with Zone Defense. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions.

DIRECTIONS FOR USE ON DORMANT BERMUDAGRASS GROWN ON RESIDENTIAL TURF SITES, GOLF COURSES, SOD PRODUCTION AND SIMILAR AREAS

RESTRICTIONS

- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.090 lb flumioxazin) of Zone Defense per acre per application.
- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.090 lb flumioxazin) per acre of Zone Defense per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense application.
- **DO NOT** make more than 2 applications of Zone Defense per acre per year and do not exceed the maximum amount of Zone Defense per twelve-month period.
- **DO NOT** apply to golf course putting greens or tees.
- **DO NOT** graze or feed livestock forage cut from areas treated with Zone Defense.
- **DO NOT** irrigate within 1 hour before or after application.
- **DO NOT** apply if rain is expected within 1 hour after application.
- **DO NOT** mow turfgrass within 12 hours after application.
- **DO NOT** re-apply this product within 30 days.
- **DO NOT** apply in fall before turfgrass has ceased active growth or in late winter/early spring after turfgrass has resumed active growth.
- **DO NOT** apply this product through any time of irrigation system.
- Sod production areas must be established three (3) months prior to the initial treatment of Zone Defense.
- **DO NOT** apply this product within three (3) months of sod harvest.

PRECAUTIONS

- The addition of surfactants may cause temporary undesirable effects to turf grasses.
- Allow 8 weeks between application and seeding or sodding of turfgrass.
- Only apply Zone Defense with surfactants through previous experience has demonstrated to be physically compatible and non-injurious to the grass type in question.

TABLE: DORMANT BERMUDAGRASS RATE

When applied as directed under the conditions described, the following established turf grasses are tolerant to Zone Defense at the specified use rates in a range from 6.6 to 9.6 ounces per acre (0.25 lb sulfentrazone / 0.061 lb flumioxazin) or 0.15 to 0.22 ounce per 1,000 sq. ft. (0.0057 lb sulfentrazone / 0.0014 lb flumioxazin)

Warm Season Grasses (see note below)	Maximum Use Rate of a Single Application	
	Ounces Zone Defense per Acre	Pound Active Ingredient per Acre
Bermudagrass (<i>Cynadon dactylon</i>) Bermudagrass Hybrids (<i>Cyn Bluegrass</i>)	6.6 – 9.6	0.25 – 0.375 Sulfentrazone 0.061 – 0.090 Flumioxazin

APPLICATION – TURFGRASS AND SOD

Zone Defense may be applied as a single or split application to well established dormant Bermudagrass. This product may be applied to dormant turfgrass in such areas as apartment complexes, golf courses, sod farms, roadsides, sports fields, campgrounds, office complexes, parks, parking areas, recreational sites, schools, residential turf and other similar sites. Bermudagrass exhibits tolerance to this product only when applied to semi-dormant or completely dormant turf in the late fall and before active growth resumes in the late winter/early spring. Application of this product to actively growing turfgrass (warm season and cool season) or during green-up may cause unacceptable injury.

Zone Defense contains sulfentrazone which is a selective soil applied herbicide for the control of certain broadleaf weeds grasses and sedges. It will control numerous susceptible species when applied according to directions.

The mode of action of Zone Defense involves active ingredient uptake by weed roots and shoots. Zone Defense may be tank mixed with other herbicides labeled for use in turf. When tank mixing Zone Defense observe all instructions, mixing directions, application precautions and other label information of each product.

Adjuvant use and Sod discoloration: Good spray coverage is required for optimum control of weeds. Temporary discoloration of some sod species may result from use of surfactant, thus use of surfactants is not recommended.

If Primo is either tank-mixed or applied within 7 days of an application Zone Defense temporary discoloration of turf grass has been observed. It is recommended that Primo applications be made 7 days prior to, or after a Zone Defense application to reduce risk of turf grass discoloration.

TABLE: WEEDS CONTROLLED – RIGHTS-OF-WAYS / NON-CROP

When applied according to directions, Zone Defense will provide control of:

Common Name	Scientific Name
Kyllinga, green	<i>Kyllinga brevifolia</i>
Kullinga, false green	<i>Kyllinga gracillima</i>
Nutsedge, purple*	<i>Cyperus rotundus</i>
Nutsedge, yellow	<i>Cyperus esculentus</i>
Sedge, cylindrical	<i>Cyperus retrorsus</i>
Sedge, globe	<i>Cyperus globulosus</i>
Sedge, Surinam	<i>Cyperus surinamensis</i>
Sedge, Texas	<i>Cyperus polystachyos</i>

*Purple nutsedge: Split applications are recommended for optimum control of purple nutsedge. Apply 4 - 8 ounces per acre as an initial application followed by a second application when evidence of actively growing purple nutsedge is visible. **DO NOT** exceed the maximum rate per acre as listed in table above on tolerant grasses.

When applied as directed, Zone Defense will provide control or suppression of the following broadleaf weeds in Sod Production Fields.

Broadleaves	Scientific Name
Bittercress	<i>Cardamine spp.</i>
Black Medic	<i>Medicago lupulina</i>
Buttercup	<i>Ranunculus spp.</i>
Carolina geranium	<i>Geranium carolinianum</i>
Carpetweed	<i>Mollugo verticillata</i>
Chickweed, common	<i>Stellaria media</i>
Chickweed, mouseear	<i>Cerastium vulgatum</i>
Cinquefoil	<i>Potentilla spp.</i>
Clover	<i>Trifolium spp.</i>
Cudweed	<i>Gnaphalium spp.</i>
Dandelion	<i>Taraxacum officinale</i>
Dock, curly	<i>Rumex crispus</i>
Evening primrose	<i>Oenothera biennis</i>
Fiddleneck	<i>Amsinckia spp.</i>
Filaree	<i>Erodium spp.</i>
Garlic, wild	<i>Allium vineale</i>
Goldenrod	<i>Solidago spp.</i>
Ground ivy	<i>Glechema hederasea</i>
Henbit	<i>Lamium amplexicaule</i>
Knotweed, prostrate	<i>Polygonum aviculare</i>
Kochia	<i>Kochia scoparia</i>
Lambsquarters, common	<i>Chenopodium album</i>
Lawn burweed	<i>Soliva pterosperma</i>
Lespedeza, common	<i>Lespedeza striata</i>
Mallow, common	<i>Malva neglecta</i>
Onion, wild	<i>Allium canadense</i>
Parsley piert	<i>Alchemilla arvensis</i>
Pigweed, redroot	<i>Amaranthus retroflexus</i>
Pigweed, tumble	<i>Amaranthus albus</i>
Pineapple weed	<i>Matricaria matricariode</i>
Plantain, buckhorn	<i>Plantago lanceolata</i>
Puncture weed	<i>Tribulus terrestris</i>
Purslane, common	<i>Portulaca otableracea</i>
Pusley, Florida	<i>Richardia scabra</i>
Redweed	<i>Melochia corchorifolia</i>
Rocket, London	<i>Sisymbrium irio</i>
Smartweed, PA	<i>Polygonum pensylvanicum</i>
Sorrel, red	<i>Rumex acetosella</i>
Speedwell	<i>Veronica spp.</i>
Spurge, annual	<i>Euphorbia spp.</i>
Spurge, prostrate	<i>Euphorbia humistrata</i>
Spurge, spotted	<i>Euphorbia maculata</i>
Star of Bethlehem	<i>Omithogalum umbellatum</i>

Velvetleaf	<i>Abutilon theophrasti</i>
Violet, wild	<i>Viola pratincola</i>
Woodsorrel, creeping	<i>Oxalis corniculata</i>
Woodsorrel, yellow	<i>Oxalis stricta</i>

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

NOTE: It is important to note that not all varieties or cultivars have been evaluated under treatment with Zone Defense. Consult university or extension weed management specialists for additional information on specific local varieties or cultivars and any other pertinent information on Zone Defense under specific local conditions.

DIRECTIONS FOR USE FOR MAINTAINING BAREGROUND IN NON-CROP SITES AND RIGHTS-OF WAYS - INCLUDING RAILROAD, HIGHWAY, ROADSIDE, PIPELINE, UTILITY, INDUSTRIAL AREAS, AND FENCE ROWS

RESTRICTIONS

- **DO NOT** apply more than 9.6 ounces (0.375 lb sulfentrazone) (0.090 flumioxazin) of Zone Defense per acre per application.
- **DO NOT** apply more than 9.6 ounces (0.375 pound active) (0.090 flumioxazin) per acre of Zone Defense per twelve-month period. The twelve-month period is considered to begin upon the initial Zone Defense application.
- **DO NOT** make more than 2 applications of Zone Defense per acre per year and do not exceed the maximum amount of Zone Defense per twelve-month period.
- **DO NOT** apply Zone Defense to soils classified as sand with less than 1% Organic Matter.
- **DO NOT** apply when weather conditions favor spray drift from treated areas.
- **DO NOT** incorporate into soil after application.
- **DO NOT** apply this product through any type of irrigation system.
- **DO NOT** apply to moist or wet desirable plant foliage.
- **DO NOT** re-apply this product within 30 days.

PRECAUTIONS

- Treatment of powdery, dry soil or light sandy soil, or light sandy soil when there is little to no likelihood of rainfall soon after may result in off target movement and possible damage to actively growing susceptible crops when soil particles are moved by wind or water. **DO NOT** apply when these soil and environmental conditions are present.

RATES - RIGHTS-OF-WAYS / NON-CROP

Apply this product as a broadcast treatment at 6.6 to 9.6 ounces (0.25 to 0.375 lb sulfentrazone) (0.062 to 0.090 lb flumioxazin) per acre by ground in a minimum of 10 gallons of spray solution per acre for residual control of germinating weeds in non-crop land. Applications may be made by helicopter on railroad rights-of-way only.

TABLE: WEEDS CONTROLLED – RIGHTS-OF-WAYS / NON-CROP

When applied according to directions, Zone Defense will provide control of:

Common Name	Scientific Name
Amaranth, Palmer	<i>Amaranthus palmeri</i>
Beggarweed, Florida	<i>Desmodium tortuosum</i>
Carpetweed	<i>Mollugo verticillata</i>
Chickweed, common	<i>Stellaria media</i>
Copperleaf, hophornbeam	<i>Acalypha ostryeafolia</i>
Crabgrass species	<i>Digitaria spp.</i>

Croton, tropic	<i>Croton glandulosus</i>
Daisy, American	<i>Coreopsis grandiflora</i>
Dayflower, common	<i>Commelina communis</i>
Dayflower, Virginia	<i>Commelina virginica</i>
Dock, curly	<i>Rumex crispus</i>
Flixweed	<i>Descurainia sophia</i>
Galinsoga, hairy	<i>Galinsoga ciliata</i>
Groundcherry, clammy (seedling)	<i>Physalis heterophylla</i>
Groundcherry, cutleaf	<i>Physalis angulata</i>
Jimsonweed	<i>Datura stramonium</i>
Kochia (ALS and Triazine Resistant)	<i>Kochia scoparia</i>
Lambsquarters, common	<i>Chenopodium album</i>
Lettuce, wild	<i>Lactuca virosa</i>
Mallow, common	<i>Malva neglecta wall r.</i>
Mayweed, Chamomile	<i>Anthemis cotula l.</i>
Mexicanweed	<i>Caperonia castanifolia</i>
Milkweed, honeyvine	<i>Ampelamus albidus</i>
Morningglory species	<i>Ipomoea spp.</i>
Mustard, species	<i>Brassica spp.</i>
Nightshade species	<i>Solanum spp.</i>
Nutsedge speices	<i>Cyperus spp.</i>
Pigweed, redroot	<i>Amaranthus retroflexus</i>
Pigweed, smooth	<i>Amaranthus hybridus</i>
Texasweed	<i>Caperonia palustrus</i>
Thistle, Russian	<i>Salsola iberica</i>
Waterhemp, common	<i>Amaranthus rudis</i>
Waterhemp, tall	<i>Amaranthus tuberculatos</i>

For information on other weeds not listed above, refer to **TABLE: WEEDS CONTROLLED OR SUPPRESSED BY ZONE DEFENSE APPLICATION.**

APPLICATION - RIGHTS-OF-WAYS / NON-CROP

Apply Zone Defense to the following sites:

- Railroad rights-of-way, including railroad yards, railroad crossings and railroad bridge abutments to control weeds and maintain bare ground.
- Highway, roadside, pipeline and utility rights-of-way. Such areas would include, but are not limited to, guard rails, road shoulders, electric utility substations, pipeline pumping stations, around electric transmission towers, around distribution line poles and in other areas where complete vegetation control is desired.
- Industrial areas including production facilities, tank farms, storage areas, parking areas, lumber yards, airports, military installations, along fence rows, and in similar non-crop sites where complete vegetation control is needed.
- Apply alone or in combination with other herbicides for residual control of weeds in early Spring, late Summer or Fall, or early Spring to insure adequate moisture for soil activation.

TANK MIXES

It is the pesticide user's responsibility to ensure that all products are registered for the intended use. Read and follow the applicable restrictions for use on all product labels involved in tank mixing. Users must follow the most restrictive directions for use and precautionary statements of each product in the tank mixture.

Use labeled rates of burndown herbicides such as glyphosate, diquat, 2,4-D, dicamba, etc. as tank mixtures with Zone Defense. Use recommended adjuvants for the herbicide tank mix partner.

DISCLAIMER, RISKS OF USING THIS PRODUCT, LIMITED WARRANTY AND LIMITATION OF LIABILITY

IMPORTANT: Read the entire Label including this Disclaimer, Risks of Using this Product, Limited Warranty, and Limitation of Liability before using this product. If the terms are not acceptable THEN DO NOT USE THE PRODUCT; rather, return the unopened product within 15 days of purchase for a refund of the purchase price.

RISKS OF USING THIS PRODUCT

The Buyer and User (referred to collectively herein as “Buyer”) of this product should be aware that there are inherent unintended risks associated with the use of this product which are impossible to eliminate. These risks include, but are not limited to, injury to plants and crops to which this product is applied, lack of control of the target pests or weeds, resistance of the target pest or weeds to this product, injury caused by drift, and injury to rotational crops caused by carryover in the soil. Such risks of crop injury, non-performance, resistance or other unintended consequences are unavoidable and may result because of such factors as weather, soil conditions, disease, moisture conditions, irrigation practices, condition of the crop at the time of application, presence of other materials either applied in the tank mix with this product or prior to application of this product, cultural practices or the manner of use or application, (or a combination of such factors) all of which are factors beyond the control of Helm Agro. The Buyer should be aware that these inherent unintended risks may reduce the harvested yield of the crop in all or a portion of the treated acreage, or otherwise affect the crop such that additional care, treatment and expense are required to take the crop to harvest. If the Buyer chooses not to accept these risks, THEN THIS PRODUCT SHOULD NOT BE APPLIED. By applying this product Buyer acknowledges and accepts these inherent unintended risks AND TO THE FULLEST EXTENT ALLOWED BY LAW, AGREES THAT ALL SUCH RISKS ASSOCIATED WITH THE APPLICATION AND USE ARE ASSUMED BY THE BUYER. Helm Agro shall not be responsible for losses or damages (including, but not limited to, loss of yield, increased expenses of farming the crop or such incidental, consequential or special damages that may be claimed) resulting from use of this product in any manner not set forth on the label. Buyer assumes all risks associated with the use of this product in any manner or under conditions not specifically directed or approved on the label.

CONDITIONS OF SALE AND LIMITATION OF WARRANTY AND LIABILITY

NOTICE: Read the entire Directions for Use and Conditions of Sale and Limitation of Warranty and Liability before buying or using this product. If the terms are not acceptable, return the product at once, unopened, and the purchase price will be refunded.

Follow Directions for Use of this product carefully. It is impossible to eliminate all risks inherently associated with the use of this product. Crop injury, ineffectiveness or other unintended consequences may result because of such factors as manner of use or application, weather or crop conditions, presence of other materials or other influencing factors in the use of the product, which are beyond the control of Helm Agro US, Inc. or Seller. To the extent of applicable law, all such risks shall be assumed by Buyer and User, and Buyer and User agree to hold Helm and Seller harmless for any claims relating to such factors.

Helm warrants that this product conforms to the chemical description on the label and is reasonably fit for the purposes stated in the Directions for Use, subject to the inherent risks referred to above, when used in accordance with directions under normal use conditions. This warranty does not extend to the use of this product contrary to label instructions, or under abnormal conditions or under conditions not reasonably foreseeable to or beyond the control of Seller or Helm, and Buyer and User assume the risk of any such use. **HELM MAKES NO WARRANTIES OF MERCHANTABILITY OR OF FITNESS FOR A PARTICULAR PURPOSE NOR ANY OTHER EXPRESS OR IMPLIED WARRANTY EXCEPT AS STATED ABOVE.**

To the extent consistent with applicable law, in no event shall Helm or Seller be liable for any incidental, consequential or special damages resulting from the use or handling of this product. **TO THE EXTENT CONSISTENT WITH APPLICABLE LAW, THE EXCLUSIVE REMEDY OF THE USER OR BUYER, AND THE EXCLUSIVE LIABILITY OF HELM AND SELLER FOR ANY AND ALL CLAIMS, LOSSES, INJURIES OR DAMAGES (INCLUDING CLAIMS BASED ON BREACH OF WARRANTY, CONTRACT, NEGLIGENCE, TORT,**

STRICT LIABILITY OR OTHERWISE) RESULTING FROM THE USE OR HANDLING OF THIS PRODUCT, SHALL BE THE RETURN OF THE PURCHASE PRICE OF THE PRODUCT OR, AT THE ELECTION OF HELM OR SELLER, THE REPLACEMENT OF THE PRODUCT.

To the extent consistent with applicable law allowing such requirements Helm Agro must be provided notice as soon as Buyer has reason to believe it may have a claim, but in no event later than twenty-one days from date of planting, or twenty-one days from the date of application, whichever is later, so that an immediate inspection of the affected property and growing crops can be made.

To the extent consistent with applicable law if Buyer does not notify Helm Agro of any claims, in such period, it shall be barred from obtaining any remedy.

NO AMENDMENTS

Helm and Seller offer this product, and Buyer and User accept it, subject to the foregoing conditions of sale and limitations of warranty and of liability, which may not be modified except by written agreement signed by a duly authorized representative of Helm.

Roundup is trademark of Monsanto Technology LLC
Ignite is a trademark of Bayer CropScience

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[NOTES TO REVIEWER:

[Any text found in brackets “[” “]” is optional on container label.]

[State restrictions will not be found on the container label if the product is not registered in that associated state.]

[Making the product more restrictive than Federally accepted by incorporating the optional statement “Not for use in California.” Or any other “Not for use in {X state}”, may be undertaken on the container label for any use, weed or crop as determined to be necessary to procure state registration.]

[HELM may distribute or sell this product under labeling bearing any subset of the approved directions for use, provided that in limiting the uses listed on the label, no changes would be necessary in precautionary statements, use classification, or packaging of the product.]